ABLE Instruments & Controls



Installation & Maintenance Instructions

SIL IntelliPoint RF Series

Two-Wire, Point Level Safety Switch

DREXELBROOK®
A Leader In Level Measurement Solutions
AMETEK®



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Installation and Operating Instructions

SIL IntelliPoint RF Series
Two-Wire, Point Level Safety Switch

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Two-Wire, Point Level, Safety, Switch



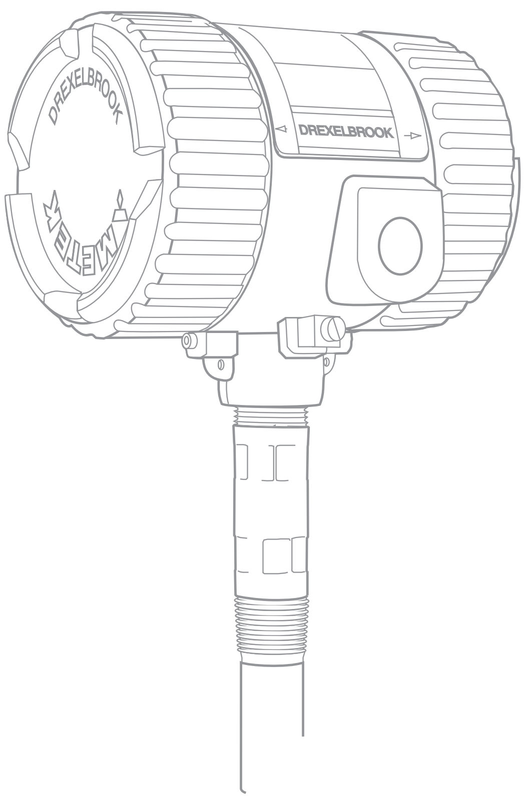
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Management summary

This report summarizes the results of the Failure Modes, Effects, and Diagnostic Analysis (FMEDA) of the Safety IntelliPoint RF™ Series Point Level Switch. A Failure Modes, Effects, and Diagnostic Analysis is one of the steps to be taken to achieve functional safety certification per IEC 61508 of a device. From the FMEDA, failure rates and Safe Failure Fraction are determined. The FMEDA that is described in this report concerns only the hardware of the Safety IntelliPoint RF™ Series Point Level Switch, electronic and mechanical, including the probe assembly. For full functional safety certification purposes all requirements of IEC 61508 must be considered.

The Safety IntelliPoint RF™ Series Point Level Switch is a two-wire, 4 – 20 mA smart device with discrete output levels. It contains self-diagnostics and is programmed to send it's output a specified state upon internal detection of a failure. For safety instrumented systems usage it is assumed that the 4 – 20 mA output is used as the primary safety variable. All other possible output variants are not covered by this report. The different devices can be equipped with or without display.

The Safety IntelliPoint RF™ Series Point Level Switch is classified as a Type B[1] device according to IEC61508, having a hardware fault tolerance of 0. The analysis shows that the device has a safe failure fraction between 90 and 99% (assuming that the logic solver is programmed to detect any currents outside the discrete output levels boundaries, see section 4.4) and therefore may be used up to SIL 2 as a single device.

The FMEDA analysis was performed for the High Level Fail Safe setting of the switch (HLFS). Table 1 lists the failure rates for the Safety IntelliPoint RF™ Series Point Level Switch according to IEC 61508, assuming that the logic solver is set to detect any currents outside a 1mA range around the three output levels.

Table 1: Failure rates according to IEC 61508

Safety IntelliPoint RF™ Series Point Level Switch	λ^{sd}	λ^{su2}	λ^{dd}	λ^{du}	SFF
High Level Fail Safe application	0 FIT	300 FIT	686 FIT	73 FIT	93.2%

These failure rates are valid for the useful lifetime of the product, see Appendix A.

A user of the Safety IntelliPoint RF™ Series Point Level Switch can utilize these failure rates in a probabilistic model of a safety instrumented function (SIF) to determine suitability in part for safety instrumented system (SIS) usage in a particular safety integrity level (SIL). A full set of failure rates is presented in section 4.5 along with all assumptions.

[1] Type B component: "Complex" component (using micro controllers or programmable logic); for details see 7.4.3.1.3 of IEC 61508-2.

[2] It is important to realize that the No Effect failures and Annunciation Undetected failures are included in the "safe" failure category according to IEC 61508. Note that these failures will not affect system reliability or safety and should not be included in spurious trip calculations

Section 1: Introduction

1.1 System Description

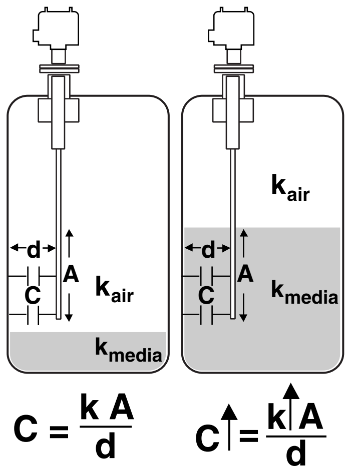


Figure 1-1

Simple Capacitance Probe (Insulating Media Shown)

The AMETEK Drexelbrook **IntelliPoint**™ Series uses **No-Cal™** technology to detect the presence or absence of material without calibration or initiation via setpoint adjustments, push-buttons, or magnets.

Installation is simple and easy. Simply apply power and the IntelliPoint system is ready to detect the presence or absence of material. Since the IntelliPoint instrument does not require calibration or setpoint adjustments, it is capable of operating in non-dedicated tanks regardless of the material being measured.

Notice: Material to be Measured Must Be Below Sensor when Power is Applied.

The **AutoVerify™** self-testing function continuously monitors the entire system to ensure proper operation. **Manual Certify™** changes the outputs in order to test the loop current and ensure proper operation of the control systems.

1.2 Technology

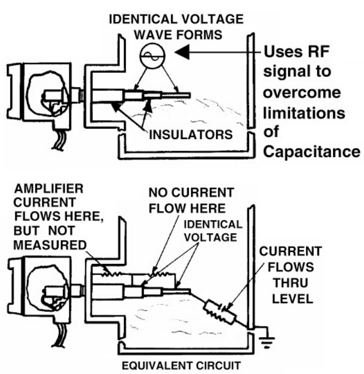


Figure 1-2

RF Admittance Probe with Cote-Shield

In a simple capacitance probe-type sensing element, when the level rises and material covers the probe, the capacitance within the circuit between the probe and the media (conductive applications) or the probe and the vessel wall (insulating applications) increases. This is due to the dielectric constant (k) of the material, which causes a bridge mis-balance. The signal is demodulated (rectified), amplified, and the output is increased. There are drawbacks, however, especially when there is coating of the probe.

An RF Admittance level transmitter is the next generation. Although similar to the capacitance concept, IntelliPoint employs a radio frequency signal and adds the Cote-Shield™ circuitry within the Electronics Unit.

This patented Cote-Shield™ circuitry is designed into the IntelliPoint series and enables the instrument to ignore the effect of buildup or material coating on the sensing element. The sensing element is mounted in the vessel and provides a change in RF admittance indicating presence or absence of material.

The Cote-Shield element of the sensor prevents the transmission of RF current through the coating on the sensing element. The only path to ground available for the RF current is through the material being measured.

The result is an accurate measurement regardless of the amount of coating on the probe, making it by far the most versatile technology, good for very wide range conditions from cryogenics to high temperature, from vacuum to 10,000psi pressure, and works with all types of materials.

1.3 Model Number

Safety IntelliPoint RF ™

Safety Switch

S

SIL

1 SIL1
2 SIL2

Technology

R RF Admittance

Measurement Type

L No Calib., 2 pF Fixed Preload

Input

T Two Wire Power Supply 13-30 VDC

Housing

0 No Approvals, NEMA 4X/IP66, M20 X 1.5 conduit entries
1 No Approvals, NEMA 4X/IP66, ¾" NPT conduit entries
2 ATEX Approved, NEMA 4X/IP66, M20 X 1.5 conduit entries
3 FM Approved, NEMA 4X/IP66, ¾" NPT conduit entries
4 CSA Approved, NEMA 4X/IP66, ¾" NPT conduit entries
5 No Approvals, NEMA 4X/IP66, M20 X 1.5 conduit entries, Dual Seal, Perm-a-Seal sensors – only
6 No Approvals, NEMA 4X/IP66, ¾" NPT conduit entries, Dual Seal, Perm-a-Seal sensors – only
7 FM Approved, NEMA 4X/IP66, ¾" NPT conduit entries, Dual Seal, Perm-a-Seal sensors – only
8 CSA Approved, NEMA 4X/IP66, ¾" NPT conduit entries, Dual Seal, Perm-a-Seal sensors – only
9 No Approvals, NEMA 4X/IP66, M20 X 1.5 conduit entries, Dual Seal, Non Perm-a-Seal sensors – only
A No Approvals, NEMA 4X/IP66, ¾" NPT conduit entries, Dual Seal, Non Perm-a-Seal sensors – only
B FM Approved, NEMA 4X/IP66, ¾" NPT conduit entries, Dual Seal, Non Perm-a-Seal sensors – only
C CSA Approved, NEMA 4X/IP66, ¾" NPT conduit entries, Dual Seal, Non Perm-a-Seal sensors – only

Electronics

0	Integral	**7**	Rmt. w/ (25 ft.) Tri-Ax Cable	**E**	Rmt. w/ (75 ft.) 1st 10ft Hi-Temp. Cbl.
1	Remote, no cable	**8**	Rmt. w/ (50 ft.) Tri-Ax Cable	**F**	Rmt. w/ (5 ft.) G.P. Cable
2	Rmt. w/ 3 m (10 ft.) G.P. Cable	**9**	Rmt. w/ (75 ft.) Tri-Ax Cable	**G**	Rmt. w/ (5 ft.) Tri-Ax Cable
3	Rmt. w/ 7.6 m (25 ft.) G.P. Cable	**A**	Rmt. w/ (10 ft.) Hi-Temp. Cable	**H**	Rmt. w/ (10 ft.) Tri-Ax Cable
4	Rmt. w/ 10.6 m (35 ft.) G.P. Cable	**B**	Rmt. w/ (25 ft.) 1st 10ft Hi-Temp. Cbl.	**J**	Rmt. w/ (35 ft.) Tri-Ax Cable
5	Rmt. w/ 15.2 m (50 ft.) G.P. Cable	**C**	Rmt. w/ (35 ft.) 1st 10ft Hi-Temp. Cbl.	**K**	Rmt. w/ (5 ft.) Hi-Temp. Cable
6	Rmt. w/ 23 m (75 ft.) G.P. Cable	**D**	Rmt. w/ (50 ft.) 1st 10ft Hi-Temp. Cbl.		

Output

0 8-16mA Output

Sensing Element

	Application	Sensing Element	Pressure/Temperature	Wetted Parts
00	General purpose	700-1202-001 remote 700-1202-021 integral	13.8 bar @ 232°C (200 PSI @ 450°F)	316SS and PEEK
01	Floating roof with cable attachment and brass bottom weight	700-1202-012 remote 700-1202-022 integral	13.8 bar @ 177°C (200 PSI @ 350°F)	316SS, Brass, and PEEK
02	General purpose, longer insertion lengths with cable attachment and 316SS bottom weight	700-1202-014 remote 700-1202-024 integral	13.8 bar @ 177°C (200 PSI @ 350°F)	316SS and PEEK
03	Proximity	700-1202-018 remote 700-1202-028 integral	13.8 bar @ 232°C (200 PSI @ 450°F)	316SS and PEEK with 76 mm (3) 316SS proximity plate
04	General purpose, high temperature and pressure	700-1202-041 remote 700-1202-042 integral	69 bar @ 121°C (1000 PSI @ 250°F) 20.7 bar @ 232°C (300 PSI @ 450°F)	316SS and PEEK
06	General purpose with FDA approved materials of construction	700-1202-031 remote 700-1202-032 integral	13.8 bar @ 232°C (200 PSI @ 450°F)	316SS and FDA grade PEEK
07	General purpose Granular materials	700-1202-010 remote 700-1202-020 integral	13.8 bar @ 232°C (200 PSI @ 450°F)	316SS and PEEK with 7/8 inch dia. 316SS collar
09	General purpose Granular materials with FDA approved materials of construction	700-1202-033 remote 700-1202-034 integral	13.8 bar @ 232°C (200 PSI @ 450°F)	316SS and FDA grade PEEK with 7/8 inch dia. 316SS collar
10	Corrosive liquids (2)(4)(9)	700-0001-018 remote	3.4 bar @ 149°C (50 PSI @ 300°F)	PFA
11	General purpose, higher pressure TFE compatibility required	700-0201-005 int/rem	69 bar @ 38°C (1000 PSI @ 100°F) 13.8 bar @ 232°C (200 PSI @ 450°F)	316SS and TFE
12	Corrosive material, higher pressure	700-0201-005 int/rem Hastelloy C	69 bar @ 38°C (1000 PSI @ 100°F) 13.8 bar @ 232°C (200 PSI @ 450°F)	Hastelloy C and TFE
13	Sanitary (3)	700-0201-036 int/rem	69 bar @ 38°C (1000 PSI @ 100°F) 13.8 bar @ 232°C (200 PSI @ 300°F)	316/316L SS and TFE
14	General Purpose, low pressure	700-0202-002 int/rem	3.4 bar @ 149°C (50 PSI @ 300°F) 1.4 bar @ 232°C (20 PSI @ 450°F)	316SS and TFE
15	Heavy duty, agitated tanks or material with high bulk density (1)	700-0202-043 remote	69 bar @ 38°C (1000 PSI @ 100°F) 13.8 bar @ 232°C (200 PSI @ 450°F)	316SS and TFE

Continued on Next Page

1.3 Model Number (Continued)

Continued from Previous Page

16	High Integrity Seal for Hazardous Materials	700-0002-360 int/rem	34.5 bar @ 149°C (500 PSI @ 300°F)	PFA
17	Sanitary (3) lowpressure	700-0202-036 int/rem	3.4 bar @ 149°C (50 PSI @ 300°F)	316SS and TFE
18	Corrosive material, higher pressure with waterlike viscosity (4)	700-0001-022 int/rem	69 bar @ 38°C (1000 PSI @ 100°F) 34.5 bar @ 149°C (500 PSI @ 300°F)	TFE
19	Interface Measurement	700-0002-023 int/rem	69 bar @ 38°C (1000 PSI @ 100°F) 34.5 bar @ 149°C (500 PSI @ 300°F)	316SS and TFE
20	Miniature Pilot Plant Sensor (1)(7)	700-0209-002 remote	6.9 bar @ 121°C (100 PSI @ 250°F) 0 bar @ 232°C (0 PSI @ 450°F)	316 SS and TFE
High Pressure / High Temperature				
60	High Pressure & Temp.	700-0204-038 remote	137.9 bar @ 93°C (2000 PSI @ 200°F) 68.9 bar @ 260°C (1000 PSI @ 500°F)	316SS and Ceramic
61	High Temperature	700-0204-002 remote	0 bar @ 816°C (0 PSI @ 1500°F)	316SS and Ceramic
62	High Pressure & Temp.	700-0204-048 remote	275.8 bar @316°C (4000 PSI @ 600°F)	316SS
ZZ	Sensing Element **Not Listed**			

Mounting Type (See separate Mounting Chart for first three digits)

	IL	CSL
xxxH	914 mm (36")	254 mm (10")
xxxJ	914 mm (36")	0 mm (0")
xxxK	1219 mm (48")	254 mm (10")
xxxL	1524 mm (60")	254 mm (10")
P00X	IL/CSL Other	
xxxZ	Other	

S		R		T			0		

IMPORTANT:
Minimum Active Length for SIL Compliance is 24" (610mm)
Consult Factory for Shorter Lengths

Notes: CSL (Cote-Shield Length) should extend through Nozzle + Typical "Wall Buildup" + 2 Inches

(1) Available with remote electronics only
(2) Use A1P mounting option
(3) Choose only sanitary mounting options
(4) Available with 0-inch CSL only
(5) Use P00X mounting option
(6) Use A1B mounting option
(7) Use A8B mounting option (¼-inch NPT)
(8) Choose from flange mounting only
(9) FM approved with remote electronics only

Not all mounting options are available with all sensing elements

NPT Threads

A1B	¾"NPT	316SS	**A2B**	1"NPT	316SS
A1C	¾"NPT	Hastelloy C	**A2C**	1"NPT	Hastelloy C
A1P	¾"NPT	PFA			

DIN Flanges

E01	25 mm	16 bar	RF 316/316L SS	**E02**	25 mm	16 bar	RF CS
EP1	25 mm	40 bar	RF 316/316L SS	**EP2**	25 mm	40 bar	RF CS
EQ1	50 mm	16 bar	RF 316/316L SS	**EQ2**	50 mm	16 bar	RF CS
ER1	50 mm	40 bar	RF 316/316L SS	**ER2**	50 mm	40 bar	RF CS
ES1	80 mm	16 bar	RF 316/316L SS	**ES2**	80 mm	16 bar	RF CS
ET1	80 mm	40 bar	RF 316/316L SS	**ET2**	80 mm	40 bar	RF CS
EU1	100 mm	16 bar	RF 316/316L SS	**EU2**	100 mm	16 bar	RF CS
EV1	100 mm	40 bar	RF 316/316L SS	**EV2**	100 mm	40 bar	RF CS
EW1	150 mm	16 bar	RF 316/316L SS	**EW2**	150 mm	16 bar	RF CS
EX1	150 mm	40 bar	RF 316/316L SS	**EX2**	150 mm	40 bar	RF CS

Sanitary TriClamps

C2B	1"TriClamp	316SS	**C4B**	2"TriClamp	316SS
C3B	1½"TriClamp	316SS			

ANSI Flanges

DA1	1"	150#	RF 316/316L SS	**DA2**	1"	150#	RF CS
DB1	1½"	150#	RF 316/316L SS	**DB2**	1½"	150#	RF CS
DC1	2"	150#	RF 316/316L SS	**DC2**	2"	150#	RF CS
DD1	2½"	150#	RF 316/316L SS	**DD2**	2½"	150#	RF CS
DE1	1"	300#	RF 316/316L SS	**DE2**	1"	300#	RF CS
DF1	1½"	300#	RF 316/316L SS	**DF2**	1½"	300#	RF CS
DG1	2"	300#	RF 316/316L SS	**DG2**	2"	300#	RF CS
DH1	2½"	300#	RF 316/316L SS	**DH2**	2½"	300#	RF CS
DI1	3"	150#	RF 316/316L SS	**DI2**	3"	150#	RF CS
DJ1	3"	300#	RF 316/316L SS	**DJ2**	3"	300#	RF CS
DK1	4"	150#	RF 316/316L SS	**DK2**	4"	150#	RF CS
DL1	4"	300#	RF 316/316L SS	**DL2**	4"	300#	RF CS
DM1	6"	150#	RF 316/316L SS	**DM2**	6"	150#	RF CS
DN1	6"	300#	RF 316/316L SS	**DN2**	6"	300#	RF CS

1.4 Dual Compartment Housing Detail

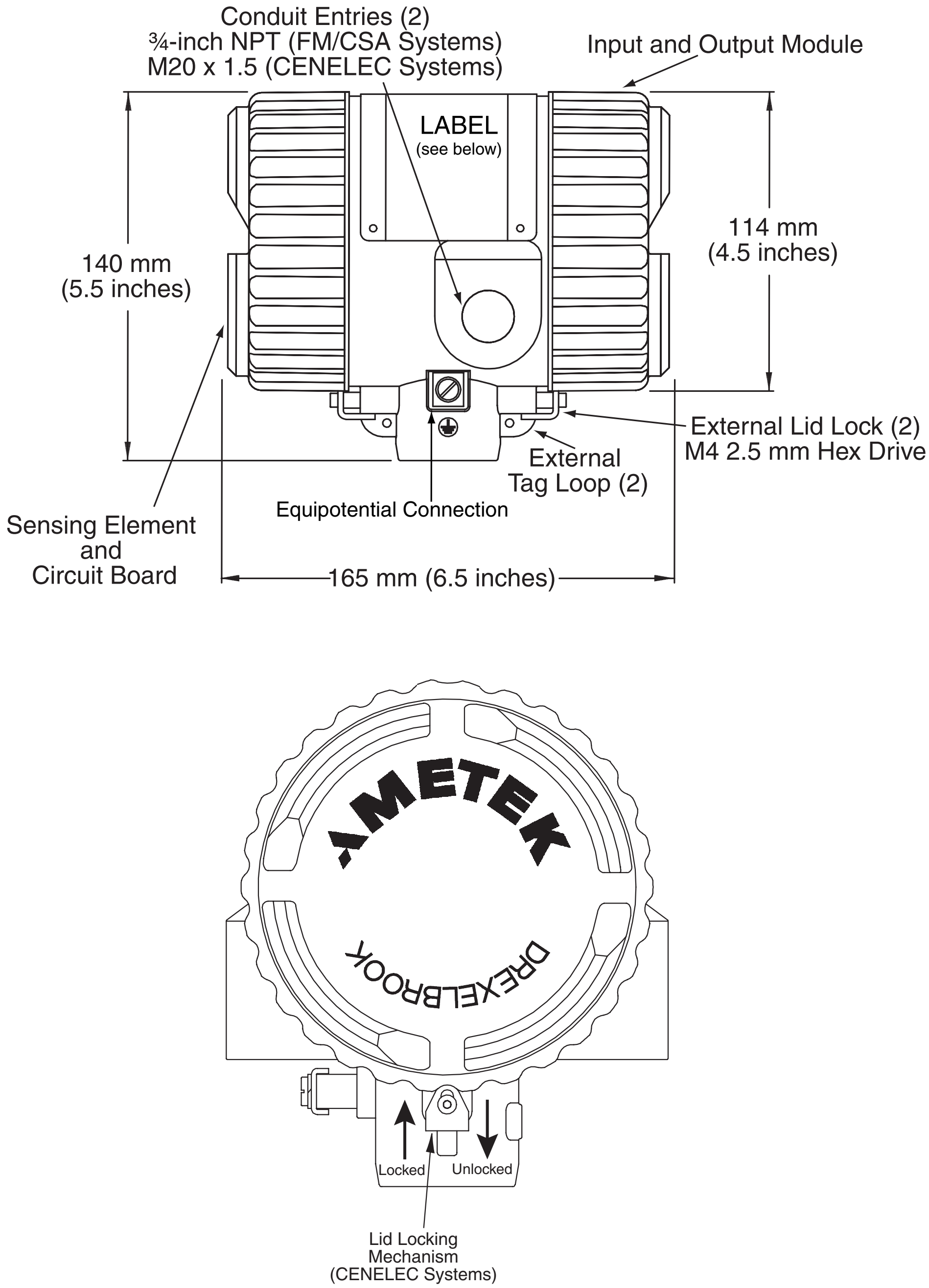


Figure 1-3
Dual Compartment Housing Detail

NOTICE ***The Input/Output Module (IOM) is located on Customer Connection side; sensing element/circuit board are on opposite side.***

Section 2: Installation

2.1 Unpacking

Carefully remove the contents of the shipping carton and check each item against the packing list before destroying any packing material. If there is any shortage or damage, report it to the factory immediately.

2.2 Mounting and Installation Guidelines

CAUTION:
The IntelliPoint RF instrument must be powered AFTER it is installed in the application and with material BELOW the sensing element.

The IntelliPoint RF instrument can be mounted vertically or horizontally at any angle. The mounting location should be as free as possible from vibration, corrosive atmospheres, and any possibility of mechanical damage. Ambient temperatures at electronics should be between -30°C to 70°C (-22°F to 158°F).

The IntelliPoint RF instrument uses a dual compartment housing and a completely encapsulated input/output module to reduce the possibility that damage may occur from water migrating into the housing through the conduit. To further reduce the possibility of damage caused by water in the conduit, install a drip loop and breather drain to purge any accumulating moisture. ***See to Figure 2-1***.

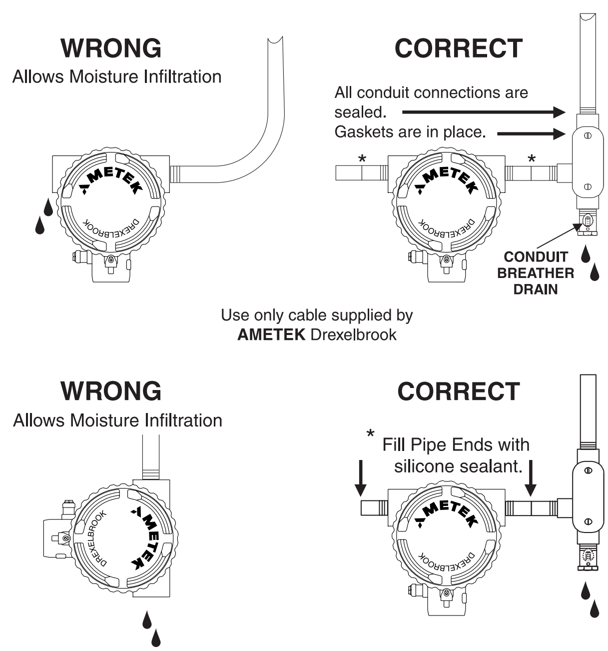


Figure 2-1
Recommended Conduit Connection

2.2 Mounting and Installation Guidelines (Continued)

After system is installed and level is **below** sensing element, apply power. The RF Series instrument does not require any calibration or setpoint adjustments and is ready to detect change in level. If properly installed, the green LED lights when power is applied. The Red LED should not be flashing. If the Red LED is flashing, refer to ***Section 4: Troubleshooting.***

NOTICE

Cable fittings supplied are weather-resistant. They are NOT certified as explosion-proof (XP) or flameproof (d) unless they are specifically marked.

The IntelliPoint RF instrument is rated Intrinsically Safe (I.S.) when power is provided from an I.S. supply.

WARNING:
IntelliPoint RF equipment is rated explosion-proof. When installing in explosion hazardous areas [rated “potentially hazardous” (EU) or “hazardous classified” (USA)] observe all national and local regulations as well as specifications in the certificate.

Mount sensing element using the following installation guidelines. ***See Figure 2-2.***

When installing IntelliPoint RF instrument, ambient temperature at electronics must not exceed 70°C (158°F).

When installing flange-mounted sensing elements, keep mating surfaces and bolts free of paint and corrosion to ensure proper electrical contact with vessel. Avoid using excessive amounts of Teflon™ tape when installing threaded sensing elements.

Install systems with threaded NPT connection via wrench flats on the process connection ONLY.

Locate sensing element to avoid enhancing electrostatic discharge from process medium, as is good practice with any thermowell, displacer, or sampler. This includes correct bonding to the tank or silo wall.

If installation area is rated explosion-proof and requires conduit seal fittings, they should be used in accordance with company standards and local codes.

2.2 Mounting and Installation Guidelines (Continued)

Mounting sensing element inside a pipe is not recommended.

Do not mount a Cote-Shield sensing element through a nozzle that exceeds length of first insulator.

Ensure that there are no obstructions or agitator blades to interfere with sensing element.

Rigid sensing elements can be mounted either vertically or horizontally.

NOTICE ***Do Not Shorten the sensing element without checking with the factory. 1-800-527-6297 or 215-674-1234***

NOTICE ***After the system has been installed, a function test (See Section 4.2) should be performed.***

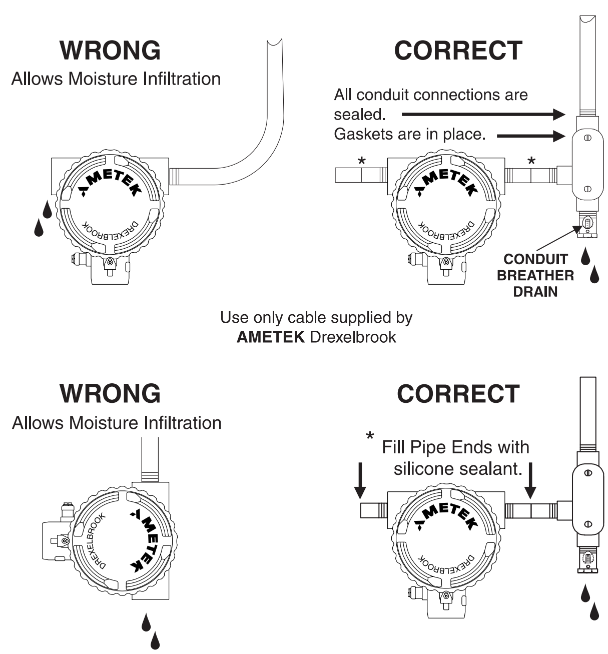
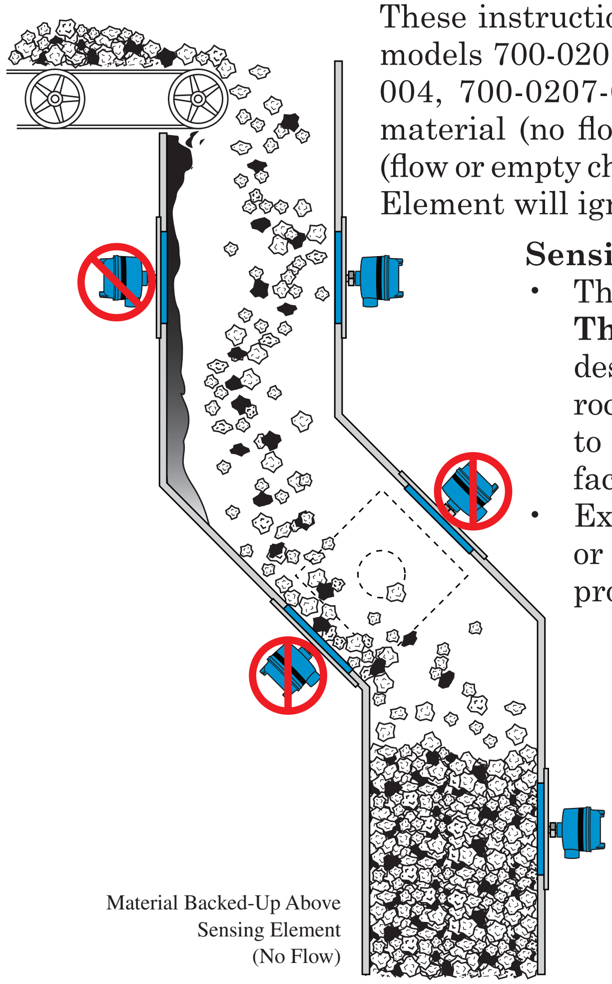


Figure 2-2
Installation Considerations

A full system function check (See Section 4.2) should be performed when:

- Any system component is changed or replaced by the user.
- Any system component is modified by the user.

2.2.1 Installation of Flush-Mounted Sensing Elements



These instructions apply to all flush on/off sensing elements, models 700-0207-001, 700-0207-002, 700-0207-003, 700-0207-004, 700-0207-006. These systems will sense presence of material (no flow or plugged chute) and absence of material (flow or empty chute) at the sensing element. The Flush Sensing Element will ignore free falling material.

Sensing Element at the Top of a Chute.

- The flush sensing element should be mounted **In The Flow Stream**. These sensing elements are designed and built to withstand the impact of coal, rock, wood, chips, etc. This location is important to prevent excessive build up of material on the face of the sensing element.
- Excessive build up, typically consisting of wet and/or sticky fines, can occur if the sensing element is protected from falling material.

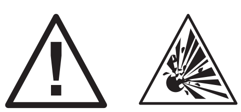
Sensing Element in an angle chute.

- Do not mount on the top or bottom.
- Best mounted on either side

Sensing Element at the Bottom

- Mount on any side.
- Low-Level sensors can be used to detect a plug or to insure that a seal is present (chute is full at this point).

2.3 Input Wiring



WARNING:
If IntelliPoint instrument is located in a hazardous environment, do not open the enclosure cover or make/break any electrical connections without first disconnecting electrical power at the source. Ensure that the wiring, electrical fittings and conduit connections conform to electrical codes for the specific location and hazard level.

The IntelliPoint RF instrument requires a 13-30 Vdc supply to operate. To access, remove the housing lid on the customer connections side to reveal the Input/Output Module **(IOM)**. The IOM is an encapsulated assembly that contains the power supply, outputs and eight wiring terminals. IOM is held in place with three screws. ***See Figure 2-3***.

2.3 Input Wiring (Continued)

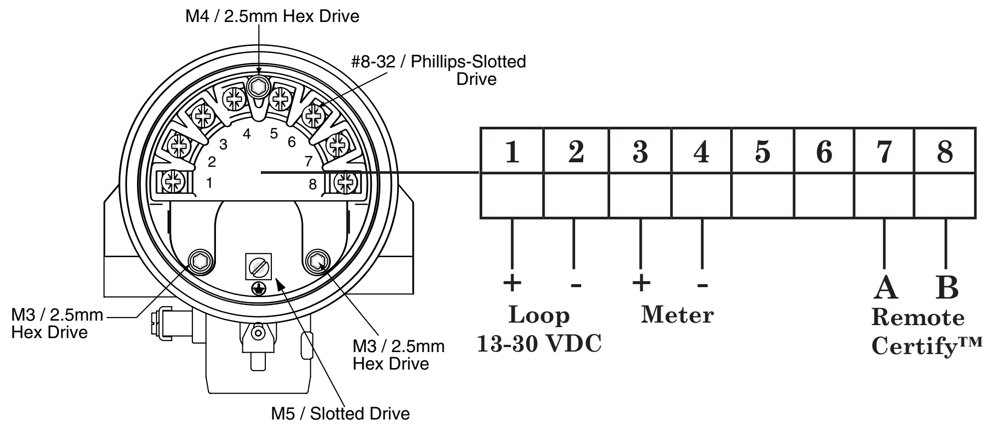


Figure 2-3
Input Wiring

2.4 Spark Protection

Applications involving insulating granulars and insulating liquids may produce a static discharge that can damage the electronics. The RF series instrument is supplied with integral heavy-duty spark protection to prevent static discharges from damaging the electronic circuits.

2.5 Circuit Board

The circuit board is located on the sensing element/circuit side of the housing (marked on label). Remove the housing lid to access the status LEDs, time delay adjustment, and configuration jumpers. ***See Figure 2-4***.

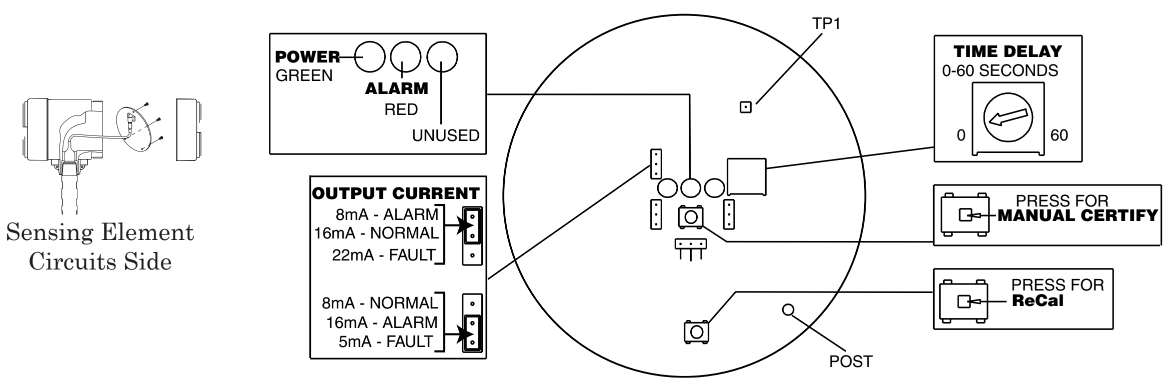


Figure 2-4
Circuit Board

NOTICE

Do **NOT** push the ReCal button without first ensuring the material being measured is below the sensing element

2.5.1 Time Delay

The "Time Delay" adjustment is located on the sensing element/circuit board side of the housing (marked on label). It is used to help stop an oscillating current output due to agitation or waves in the vessel. The time delay adjustment can be field adjusted from 0 to 60 seconds. The unit is shipped with the Time Delay set to zero (0) seconds.

Safety Switches are set to Forward Acting Time Delay only.
ie: When material first touches the sensing element, the switch enters into the alarm condition and stays in the alarm condition for the duration of the delay setting.

NOTICE

The Time Delay adjustment is a 270-Degree turn pot and is at zero seconds when in the full counter-clockwise position. Do not force the pot past the stop or damage will occur.

2.5.2 Failsafe

"Failsafe" describes the level condition that causes the transmitter to go into alarm.

Safety Switches are only applicable to High Level Fail Safe (**HLFS**) applications. Fail Safe is factory pre-set, through software, to **HLFS**.

2.5.3 Current Output Assignment

The Output Current can be configured using the jumpers as follows:

- Jumper on pin #1 and #2 creates:
  8mA - Alarm, 16mA - Normal, 22mA - Fault
- Jumper on pin #2 and #3 creates:
  8mA - Normal, 16mA - Alarm, 5mA - Fault

2.5.4 Manual / Remote Certify™

The "Certify" test feature performs a confidence test of the system by duplicating the same signal as a high-level alarm condition without requiring the system to be removed from the tank. Simulating a high level with the Manual/Remote Certify feature:

- Checks the AutoVerify™ and system circuits to ensure proper operation.

2.5.5 Manual / Remote Certify™ (Continued)

- Checks the integrity and continuity of the wiring connections.
- Verifies that the sensing element is working properly.

The "**Manual Certify**" test is initiated with the press of the Manual Certify Button located on the sensing element / circuit side of the housing.

The "**Remote Certify**" test is initiated by creating a momentary short between contacts 7 and 8 located on the power supply side of the housing. This can be done with a push button or relay closure.

After initializing the Certify test, the green LED flashes for 5 seconds and the red LED will illuminate. The current moves to the alarm condition for 2 seconds. If the red LED does not turn on, and the current does not move to the alarm condition, the Certify has detected a fault.
Consult Section 4: Troubleshooting.

2.5.5 AutoVerify™

"AutoVerify" is a self-testing function that continuously checks the system for proper operation when the unit is in the High Level Failsafe (**HLFS**) mode and in normal condition.

- The Safety IntelliPoint switch is shipped with AutoVerify Enabled, through software.
  AutoVerify Can Not be Disabled on the Safety IntelliPoint.
- If a fault is detected during the AutoVerify cycle, both LEDs will flash alternately, and the current will go to the fault output of 5mA or 22mA. ***See Section 2.5.4***

AutoVerify Criteria

1. In order for the Safety IntelliPoint to correctly detect a disconnected sensor, the sensor must generate an uncovered capacitance value greater than 5 pF. Typically, the active sensor length (active length = insertion length – cote shield length) must be greater than 24 inches (610 mm).

2. Consult Factory for specialty sensors that may be available for shorter length requirements.

2.5.6 Periodic Testing Requirement

The intent of periodic testing is to ensure the SIS continues to function according to design requirements. Periodic testing intervals should be calculated during the SIF design verification. this time interval must be made part of the maintenance procedure for this process.

2.5.7 Re-Calibration

NOTICE

Do not push the "ReCal" Button without first ensuring the material being measured is below the sensing element.

If system is powered on the bench prior to installation, or moved from one tank to another, Re-Calibration is necessary to allow software to capture the air capacitance generated by sensing element in the tank.

Merely press and hold the "ReCal" Button for 5 seconds (***Shown in Figure 2-4***). Green LED flashes for 60 seconds before reset occurs.
[*Remove power from the system while the green LED is flashing and reset will occur immediately*].

The system is now ready for installation.

Nonvolatile Memory

The IntelliPoint has nonvolatile memory which allows the unit to re-start after power outages without recalibrating.

When The IntelliPoint is powered for the first time the internal microprocessor records and stores the “Air” value.
This is the uncovered value of the sensor mounted in the vessel. The IntelliPoint will also store the last covered value and the last uncovered value.

Whenever The IntelliPoint is powered it uses these values as a reference point to determine its current condition (normal or alarm).

The IntelliPoint has nonvolatile memory which retains the recorded values even if power is lost for months. When The IntelliPoint regains power after a power outage, the microprocessor compares the stored values to the current measured value. It will then determine its current status based on this.

Example:
Air value is 10pF
covered value is 20pF
Uncovered value is 11pF
Setpoint = Alarm or recovery value.

2.5.7 Recalibration (Continued)

For alarm this would typically be 2pF above the last uncovered value (13pF in this case). For recovery this would be halfway between the uncovered and covered value (15.5pF in this case). The setpoint is stored in memory to indicate the last status of the switch.

So, when the unit regains power the microprocessor reads the current value of the sensor and determines the status based on the stored values. It will only re-calibrate if the re-call button is pressed.

2.6 Output & Status LEDs

There are two status LEDs located on the sensing element/ circuit board side of the housing. One is used to indicate that the unit has power. The second LED is used to indicate the status of the unit: **Normal** or **Alarm**. ***See Figure 2-5***.

NOTICE ***Second Red LED is not used on the two wire transmitter.***

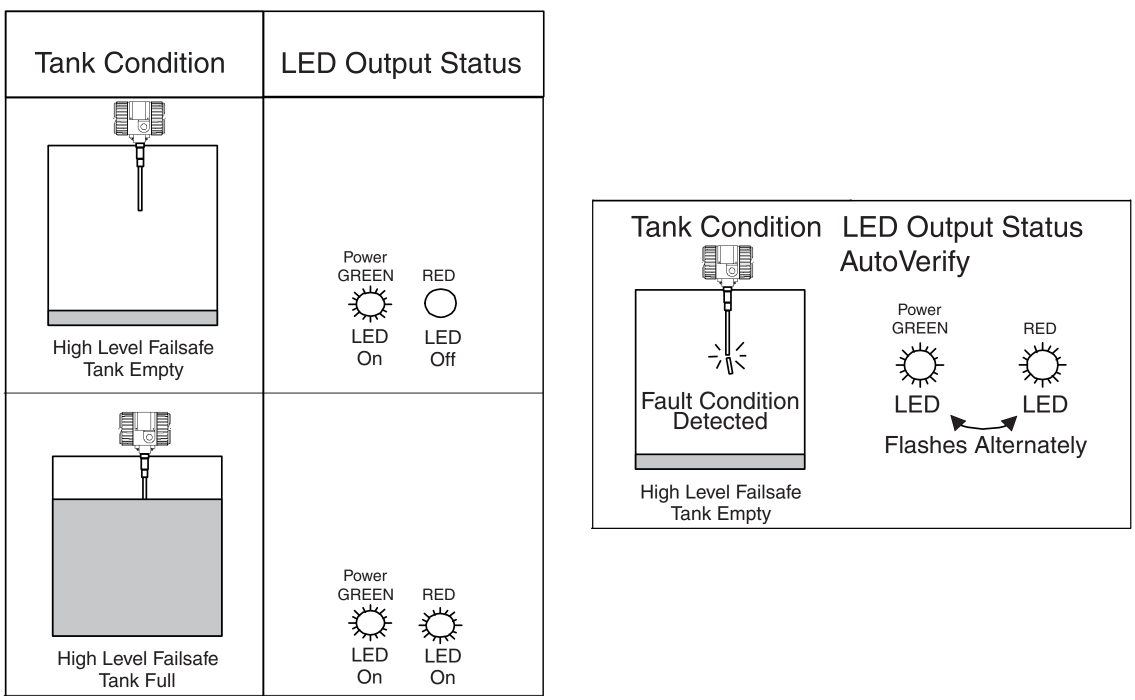


Figure 2-5
Output and LED Status

2.7 Sensing Element Connection

Sensing element connects to the rear side of the circuit board and is factory-installed.

NOTICE

The sensing element is sealed to the housing and cannot be removed without permanent damage.

For IntelliPoint RF instruments that are mounted remotely from the sensing element, the cable connections from the sensing element to the electronic unit are made to the terminals on the sensing element side of the housing. See Figure 2-7. Connect Green (Ground) wire to green screw, Red (Shield) wire to red screw, and Blue (Center) wire to blue screw.

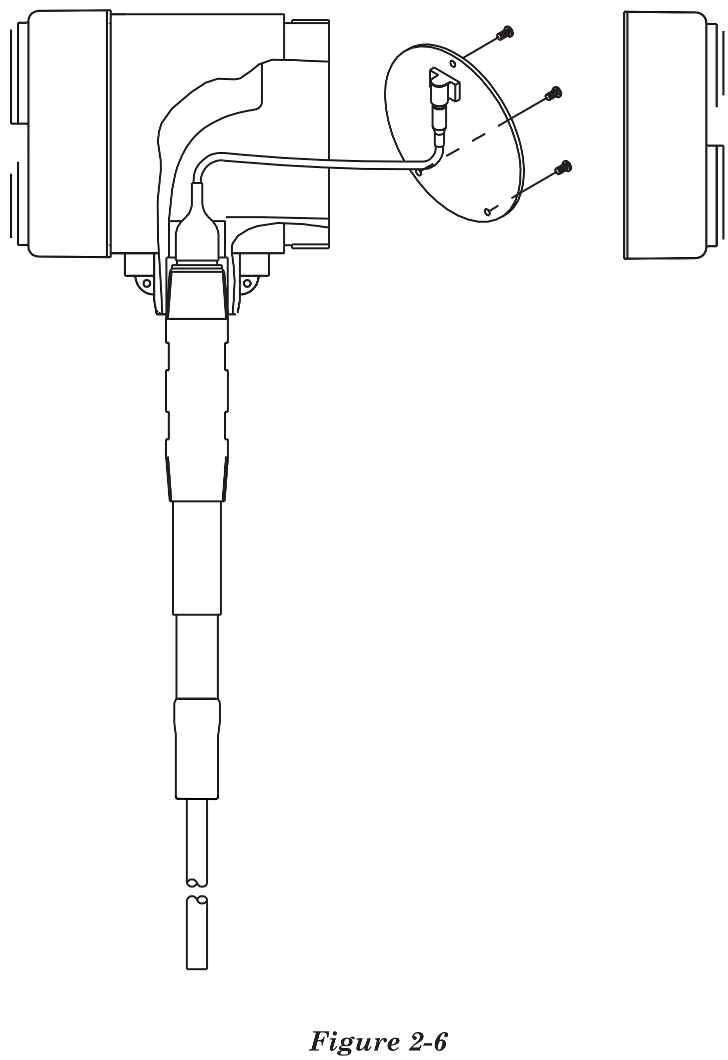


Figure 2-6
Sensing Element Connection (Integral Mounting)

2.7 Sensing Element Connection (Continued)

For IntelliPoint RF instruments that are mounted remotely from the sensing element, the cable connections from the sensing element to the electronic unit are made to the terminals on the sensing element side of the housing (marked on label). ***See Figure 2-7***. Connect Green (Ground) wire to Green screw, Red (Shield) wire to red screw, and Blue (Center) wire to blue screw.

NOTICE **See Section 6.4 for Spark Protection, Mounting and Wiring**

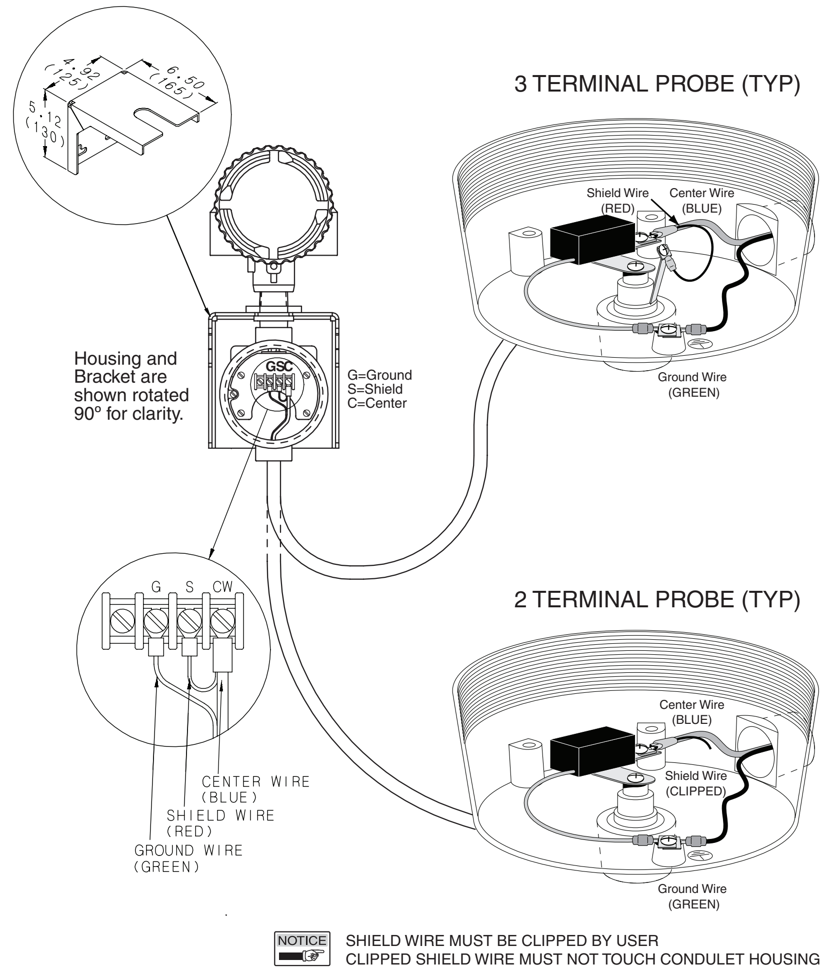


Figure 2-7
Sensing Element Connection (Remote Mounting)

NOTICE ***After the system has been installed, a function test (See Section 4.2) should be performed.***

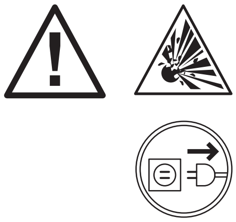
A full system function check (See Section 4.2) should be performed when:

- Any system component is changed or replaced by the user.
- Any system component is modified by the user.

Section 3: Spare Parts List

O-ring	250-1-75
Housing ¾-inch NPT Conduit Entry	260-2-540
Housing M20 Conduit Entry	260-2-542
Input/Output Module	Consult Factory
Circuit Board	385-48-3-S

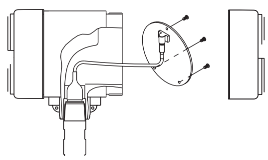
Section 4: Troubleshooting



WARNING:
If IntelliPoint instrument is located in a hazardous environment, do not open enclosure cover or make/break any electrical connections without first disconnecting electrical power at the source. Ensure that wiring, electrical fittings and conduit connections conform to electrical codes for the specific location and hazard level.

4.1 Testing Sensing Element

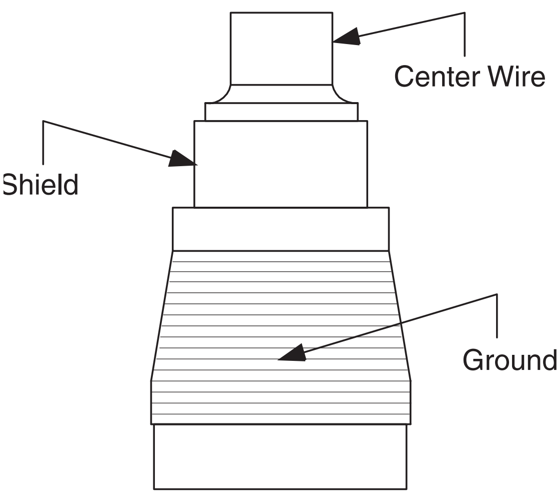
To test the sensing element, disconnect the integral cable. ***See Figure 4.1.***



Sensing Element Circuits Side

Expect the following measurements:

Three Terminal Probes without Shield Tab



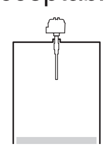
Measured Resistance (Sensor dry and clean):

Center Wire - Shield	∞ Ohms
Center Wire - Ground	∞ Ohms
Shield - Ground	∞ Ohms

Resistance readings must be taken using an analog ohmeter set to Rx1000 scale.

When tank level is known to be below the sensor, minimum acceptable values are:

CW-G 1000 ohms.
CW-S 600 ohms.
S-G 300 ohms.



If the readings are less than the minimum acceptable values:

1. Check to see if tank is full, or if a severe coating is present.

2. Clean sensor and re-measure the sensor resistances.

NOTICE

Note: Low resistance readings are acceptable if the sensor is covered with a conductive liquid. Also, low resistance readings can be the result of material lodging in a long mounting nozzle. Refer to Figure 2-2.

NOTICE

Note: A reading of zero ohms usually indicates a metal-to-metal short circuit. Check for contact with tank wall, mounting nozzle, or other tank structure.

Figure 4.1
Testing Sensing Element

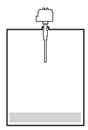
4.2 Testing Electronic Unit



This test is only a test of the electronic unit for troubleshooting purposes, and does not serve as a Verify or Certify test of the complete system.

Use the following steps to test the electronic unit:

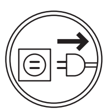
1. Be sure the environment is safe before removing the lid from the housing.

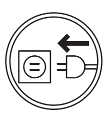


2. If possible to access the sensing element with the material below the sensor, or remove the IntelliPoint from the vessel, use your finger to touch TP1 (Shown in Figure 2-4) while holding any bare metal portion of the instrument housing with the other hand. The system should go to its alarm state.

3. Again with no material touching the sensing element, touch the tip of the sensing element with your finger, while holding any bare metal portion of the instrument housing with the other hand. The system should go to its alarm state.

4. If the IntelliPoint changes to the alarm state while touching test point TP 1, but not when touching the tip of the sensor, in most cases, the interconnecting cable is faulty. See Section 4.5: Testing Integral Cable, or Section 4.6 Testing Remote Cable.





5. If IntelliPoint is stuck in one state:
   A. Remove power.
   B. Disconnect coax cable that joins sensing element to electronic unit.
   C. Apply power.
   D. Repeat steps 3 and 4.
   E. If IntelliPoint changes state with sensing element disconnected, in most cases, sensing element is faulty. ***See Section 4.1: Testing Sensing Element.***

6. If there was no action in any of steps 2, 3, or 4 and unit appears dead:
   A. Remove and then reapply power.
   B. Press **ReCal** Button (***Shown in Figure 2-4***).
   C. Observe that green LED flashes for about 60 seconds.
   D. Green LED should be lit after 60 seconds.
   E. Touch test point (***Shown in Figure 2-4***) with your finger.
   F. Alarm & Relay should change state. If so, circuit board is working properly.
   G. Reinstall instrument and press **ReCal** Button.

7. If IntelliPoint fails all of above tests, in most cases instrument is faulty. Use a replacement Input/Output Module (**IOM**) or circuit board to determine fault. ***Consult factory***.

4.3 Over Range

If Red LED is flashing quickly (4 times/second), IntelliPoint has detected that uncovered sensing element capacitance exceeds limits of transmitter. Consult factory for pad capacitor values and instructions.

4.4 Under Range

If Red LED is flashing slowly (once per second), IntelliPoint has detected that:

1. Pad capacitor value is too large. Consult factory for pad capacitor values.
2. Sensor is disconnected.
3. Sensor interconnecting cable is damaged.

4.5 Testing Integral Cable

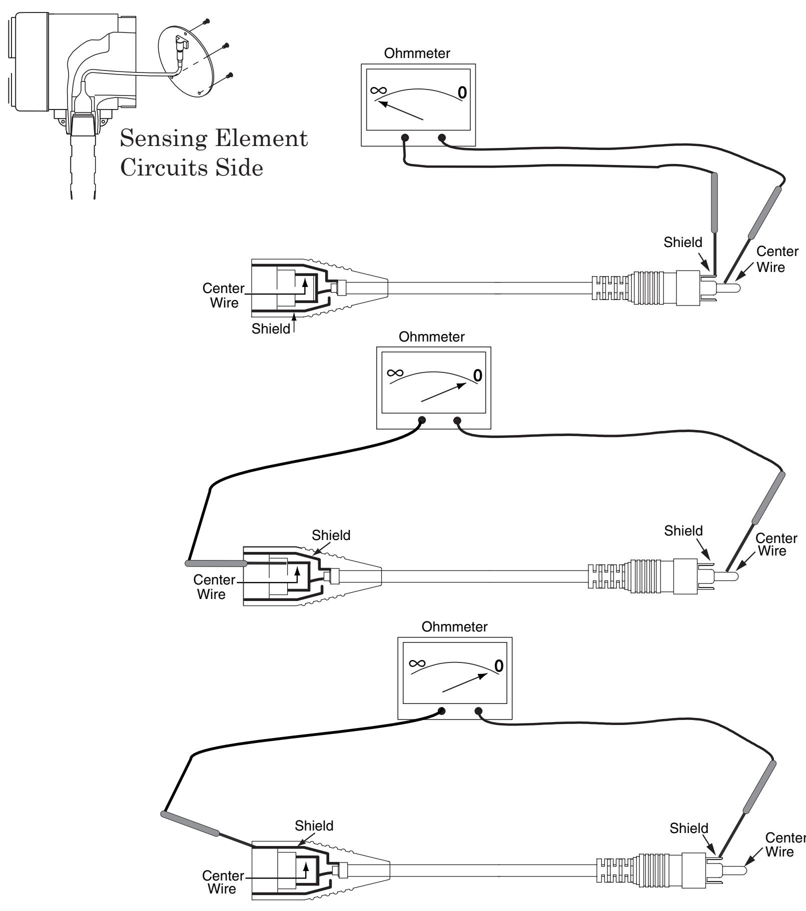


Figure 4-2
Testing Integral Cable

4.6 Testing Remote Cable

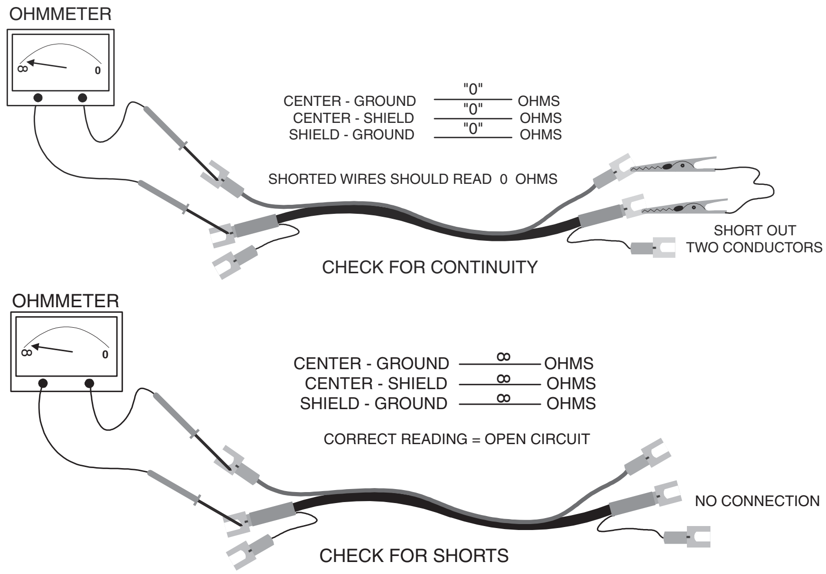


Figure 4-3
Testing Remote Cable

4.7 Testing Power Supply

Power supply can be tested separately as follows:
1. Remove power from electronic unit.
2. Remove three screws holding circuit board into housing.
3. Disconnect sensing element connection. ***See to Section 2.7 Sensing Element Connection***.
4. Reapply power.
5. Using a DC voltmeter, measure voltage from -5 to Common and +5 to Common. Correct readings are -5 to -6 and +5 to +6 Vdc. ***See Figure 4-4***.

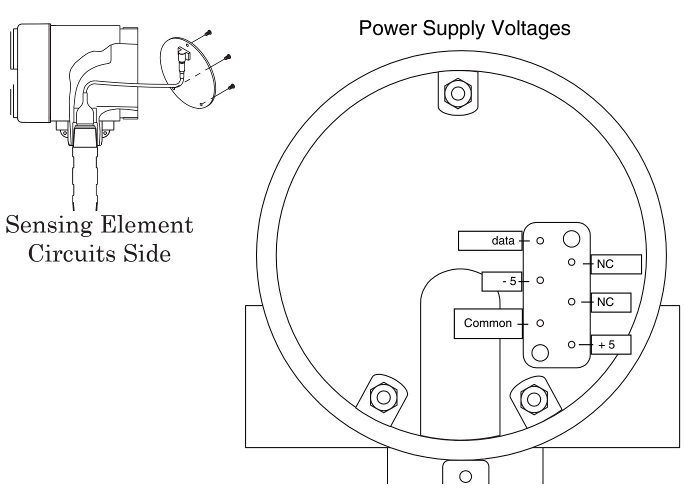


Figure 4-4
Testing Power Supply

4.8 Factory Assistance

AMETEK Drexelbrook can answer any questions about this, or any Drexelbrook instrument. Call Customer Service at: 1-800-553-9092 (US and Canada) or +1 215 674-1234 (International).

If you require assistance and attempts to locate the problem have failed:

Contact your local Drexelbrook representative,

Telephone the Service department toll-free:

- 1-800-527-6297 (US and Canada)
- +1 215 674-1234 (International)

FAX: Service Department + 215-443-5117
E-Mail: drexelbrook.service@ametek.com

Please provide the following information:

- Instrument Model Number
- Sensing Element Model Number and Length
- Original Purchase Order Number
- Material being measured
- Temperature
- Pressure
- Agitation
- Brief description of the problem
- Checkout procedures that have failed

4.9 Field Service

Trained field servicemen are available on a time-plus-expense basis to assist in start-ups, diagnosing difficult application problems, or in-plant training of personnel. Contact the service department for further details.

4.10 Customer Training

Periodically, AMETEK Drexelbrook instrument training seminars for customers are held at the factory. These sessions are guided by Drexelbrook engineers and specialists, and provide detailed information on all aspects of level measurement, including theory and practice of instrument operation. For more information write to:
AMETEK Drexelbrook, Communications/ Training Group
or call 215-674-1234.

4.11 Equipment Return

In order to provide the best service, any equipment being returned for repair or credit must be pre-approved by the factory.

In many applications, sensing elements are exposed to hazardous materials.

- **OSHA mandates** that our employees be informed and protected from hazardous chemicals.
- **Material Safety Data Sheets (MSDS)** listing the hazardous materials to which the sensing element has been exposed MUST accompany any repair.
- It is your responsibility to fully disclose all chemicals and **decontaminate** the sensing element.

To obtain a return authorization (RA#), contact the Service department at 1-800-527-6297 (US and Canada) or + 215-674-1234 (International).

- Please provide the following information:
- Model Number of Return Equipment
- Serial Number
- Original Purchase Order Number
- Process Materials to which the equipment has been exposed.
- MSDS sheets for any hazardous materials
- Billing Address
- Shipping Address
- Purchase Order Number for Repairs
- Please include a purchase order even if the repair is under warranty. If repair is covered under warranty, you will not be charged.

Ship equipment freight prepaid to:

AMETEK-DREXELBROOK.
205 KEITH VALLEY ROAD
HORSHAM, PA 19044-1499
COD shipments will not be accepted

Section 5: Specifications

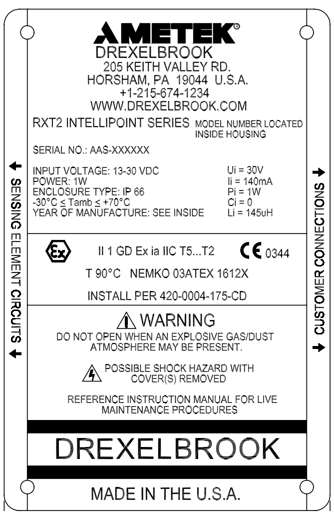
Technology:	RF/Capacitance
Safety:	SIL 2, FMEDA, IEC61508-2, 7.4.3.1 1999 (Exida)
Calibration:	None
Modes of Operation:	High level
Repeatability:	2mm (0.08 inch) conductive liquids
Response Time:	Less than 1 second
Time Delay:	0 to 60 seconds forward acting
Ambient Electronics:	-30 to 70°C (-28 to 158°F) KEMA -40 to 70°C (-40 to 158°F) FM / CSA
Storage Temperature:	-40 to 85°C (-40 to 185°F)
Indicators:	LEDs: Green Power, Red Alarm Status
Self-Check:	Continuous AutoVerify and Manual Certify
Power Supply:	13 to 30 VDC *Note: The minimum supply voltage at the transmitter terminal is:* 13 VDC at 22mA (Fault) 19 VDC at 5mA (Fault)
Power Consumption:	1 watt maximum
Output:	8 mA - Alarm 16 mA - Normal 22 mA - Fault (or field-selectable) 8 mA - Normal 16 mA - Alarm 5 mA - Fault
Housing (Electronics):	Dual Compartment, powder-coated aluminum with two cable entries
Cable Entry:	M20 x 1.5 CENELEC ¾-inch NPT FM/CSA
Ingress Protection:	IP66 NEMA 4, 4X

5.1 Approvals

FM APPROVED

Explosion-proof for use in Class I, Division 1, Groups A, B, C, and D, Dust-Ignition proof for use in Class II and III, Division 1, Groups E, F, and G; Non-incendiary for use in Class I, Division 2, Groups A, B, C, and D; Suitable for use in Class II and III, Division 2, Groups F and G Hazardous (Classified) Indoor and Outdoor (Type 4, 4X, IP66) Locations with Intrinsically Safe connections to Class I, II, and III, Division 1, Groups A, B, C, D, E, F, and G Hazardous (Classified) locations in accordance with control drawing 420-0004-173-CD; Intrinsically Safe for use in Class I, II, and III, Division 1, Groups A, B, C, D, E, F, and G hazardous (Classified) locations in accordance with entity requirements and control drawing 420-0004-173-CD.

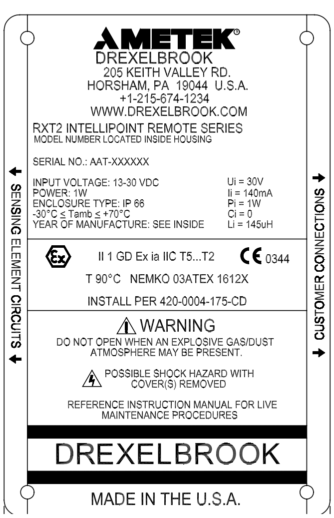
ATEX



Integral

II 1 GD EX ia IIC T5...T2
T 90°C NEMKO 03 ATEX 1612X 0344

Temperature Class	Process Temperature
T5	100°C
T4	135°C
T3	200°C
T2	230°C



Remote

II 1 GD EX ia IIC T5...T2
T90°C NEMKO 03 ATEX 1612X 0344

5.1 Approvals (Continued)

Class I, Groups A,B,C, and D with Intrinsically Safe Probe; ClassII, Groups E, F, and G; Class III

IntelliPoint RF Point Level System RXL4 Series; Rated supply: 18...200Vdc or 85...250Vac max.; 400Hz, 2W Relay: 250V, 5A with or without optional remote sensing element connection box; Temperature Code T5; Maximum Ambient Temperature +70º C; CSA Enclosure Type 4X.

IntelliPoint RF Two-Wire Point Level System RXT4 Series; Rated 30Vdc max., 140mA max. with or without optional remote sensing element connection box; Temperature Code T4; Maximum Ambient Temperature +70º C; CSA Enclosure Type 4X.

Note: The Intrinsically Safe Circuits remain internal to the device.

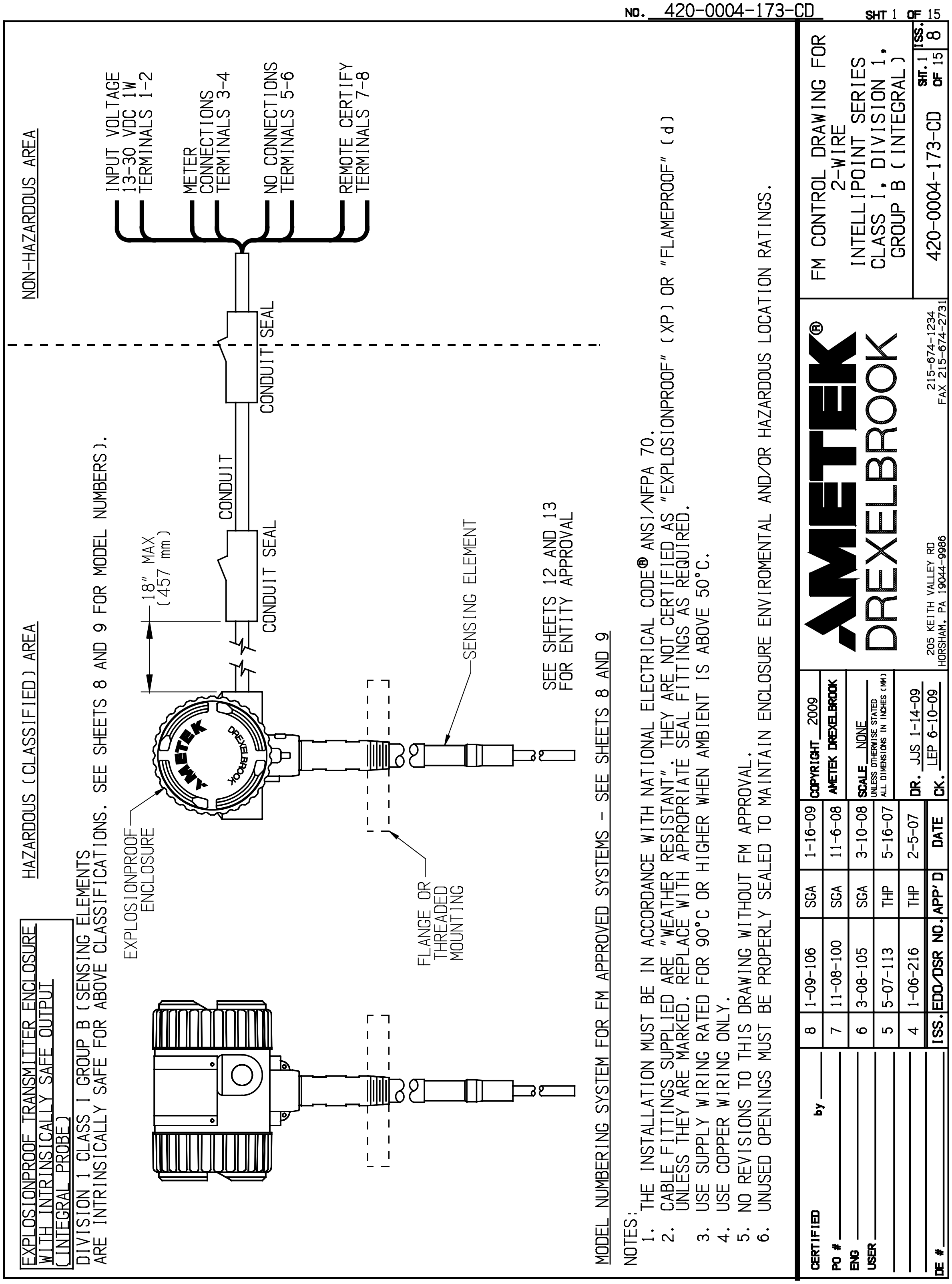
Class I, Div 2, Groups A, B, C, and D; Class II, Groups E, F, and G; Class III

IntelliPoint RF Two-Wire Point Level System RXT4 Series; Rated 30Vdc max., 140mA max.; Temperature Code T4; Maximum Ambient Temperature +70º C; CSA Enclosure Type 4X.

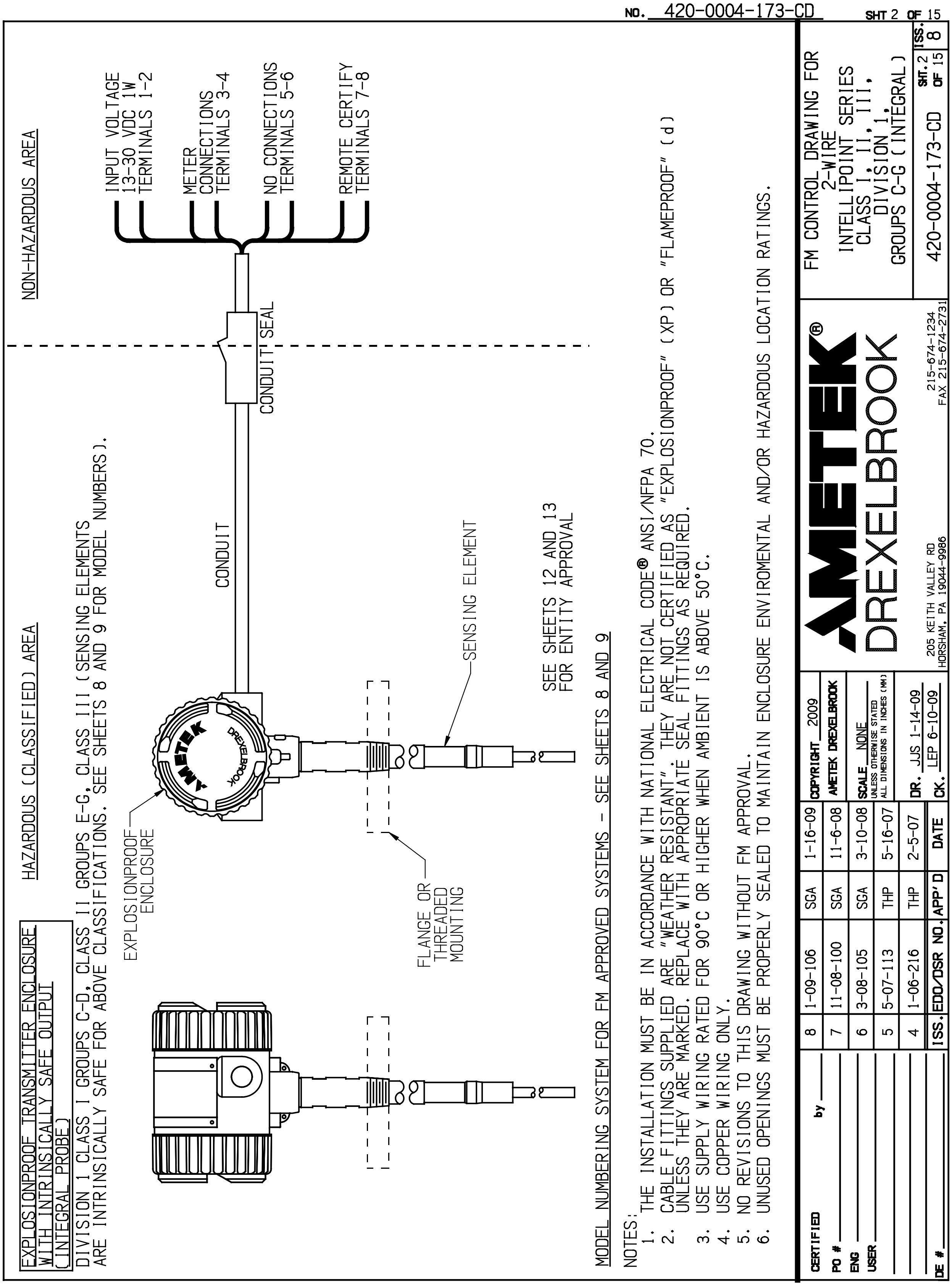
Section 6

Section 6: Control Drawings

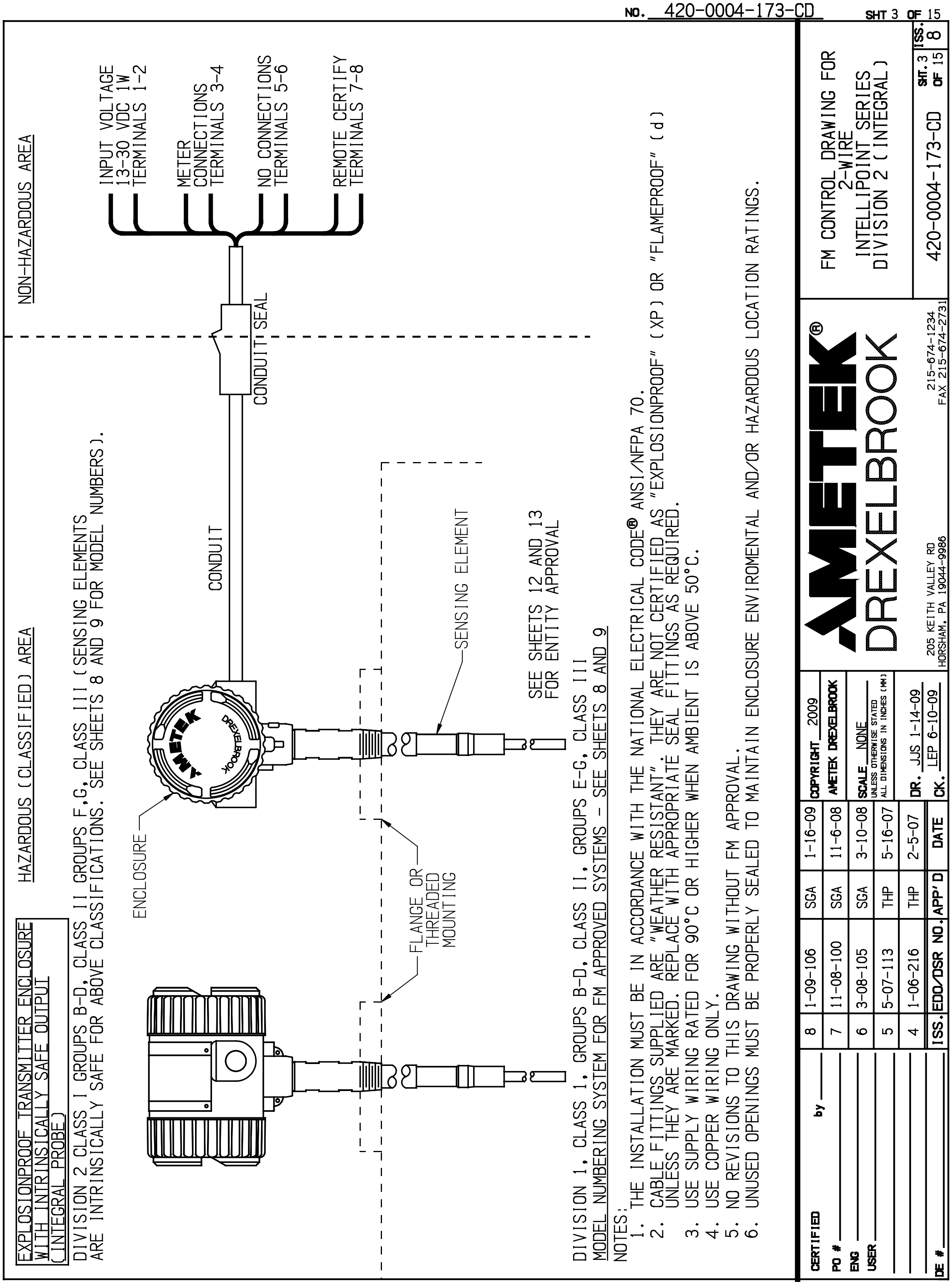
6.1 FM Control Drawings



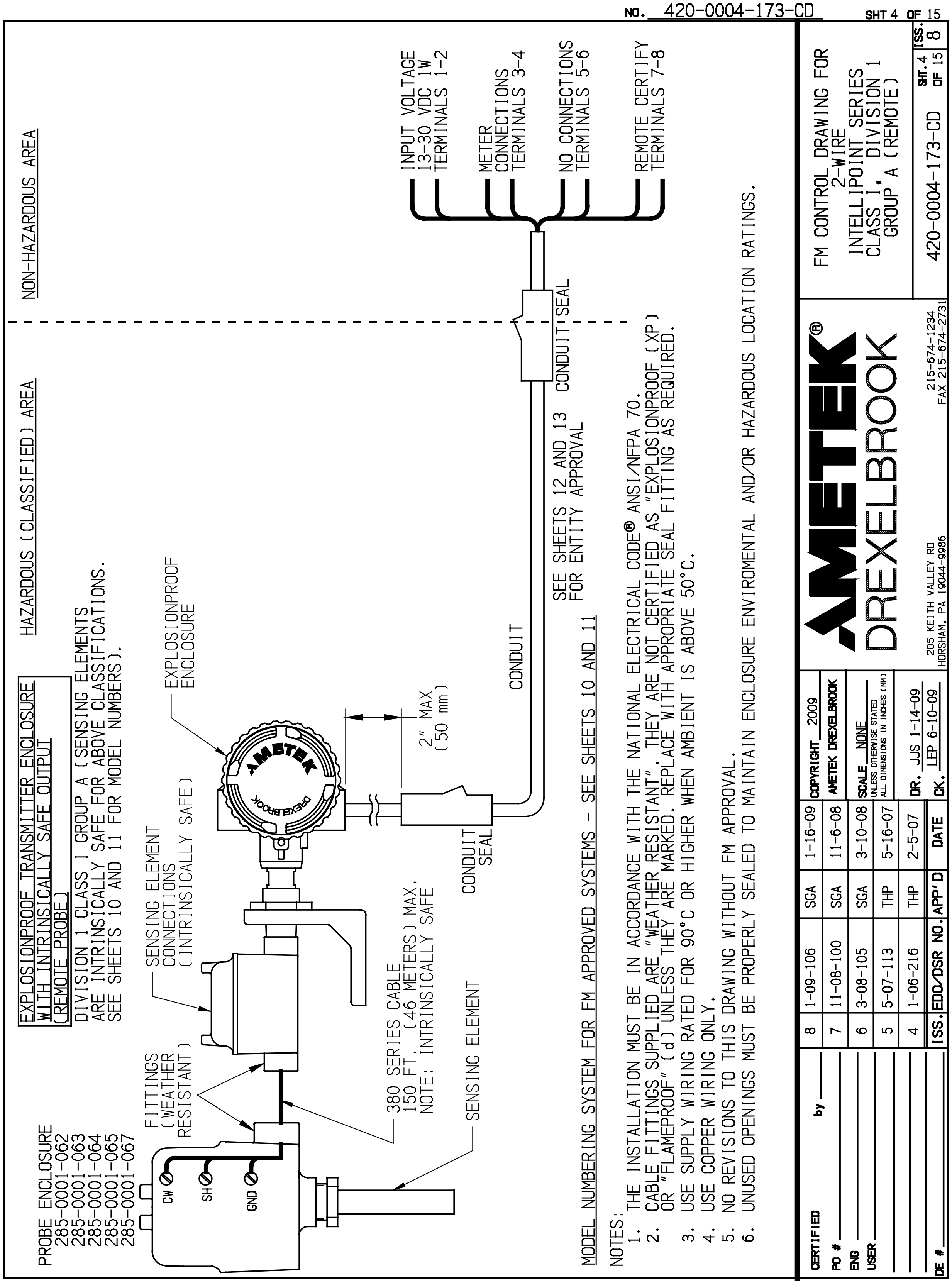
6.1 FM Control Drawings (Continued)



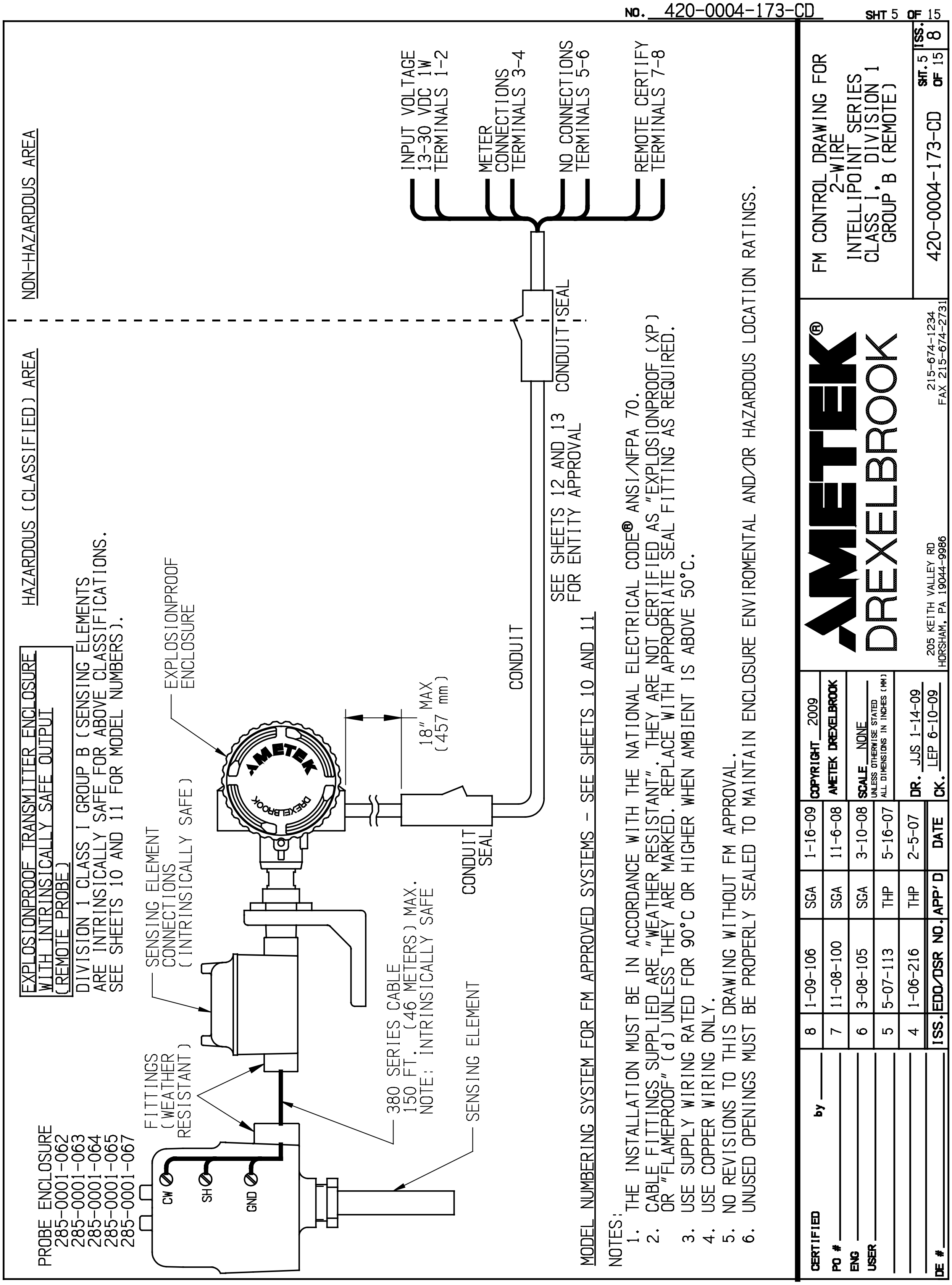
6.1 FM Control Drawings (Continued)



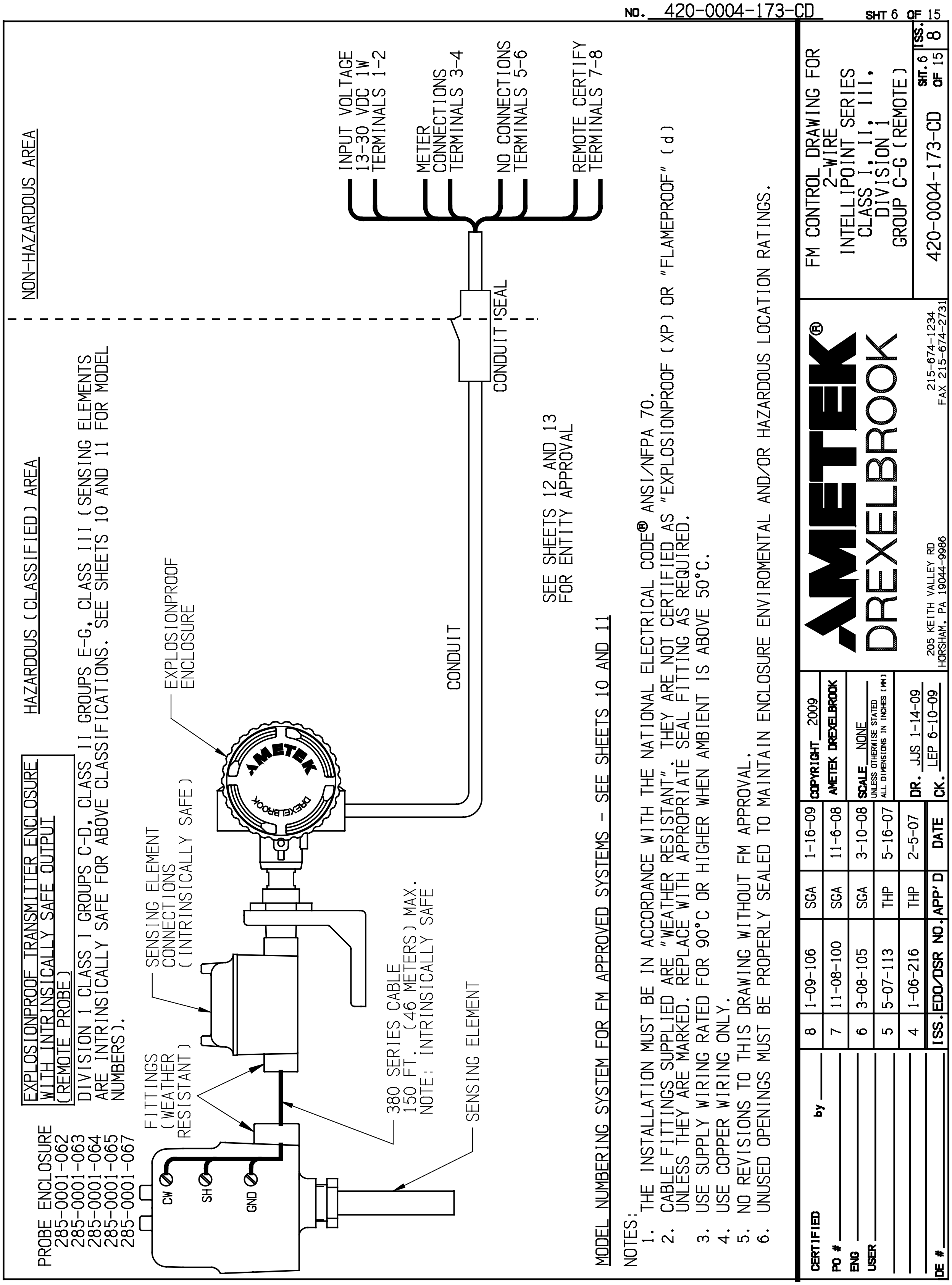
6.1 FM Control Drawings (Continued)



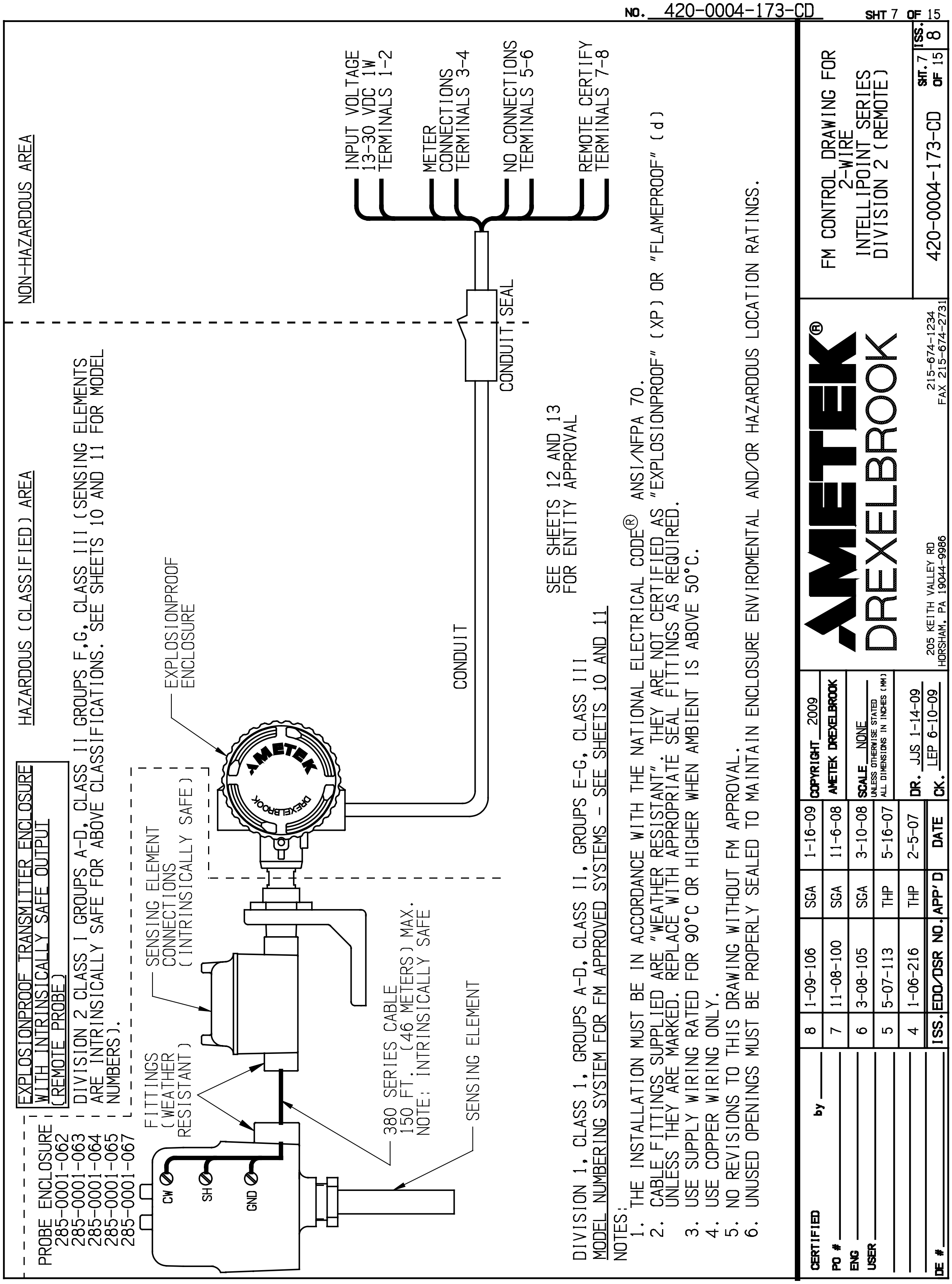
6.1 FM Control Drawings (Continued)



6.1 FM Control Drawings (Continued)



6.1 FM Control Drawings (Continued)



6.1 FM Control Drawings (Continued)

COLUMNS 9 AND UP DO NOT AFFECT SAFETY

1	2	3	4	5	6	7	8	9	10	11	12	
R	a	T	b	0	0	c	d	*	*	*	e	a = OPTIONS
	a											N = NO-CAL (STD) — L = STANDARD AUTO CAL
												M = MANUAL SET POINT ADJUSTMENT — T = 10pf AUTO CAL
												H = HI SENSITIVITY — V = 10pf FIXED
												G = HI SENSITIVITY MANUAL SET POINT ADJUSTMENT — P = HI SENSITIVITY .5pf FIXED
			b									b = OPTIONS ⟨8⟩
			3									(STD)
			7									DUAL SEAL
			B									DUAL SEAL
						c						c = 0, 1 OR Z SENSING ELEMENTS
							d					d = 0-4, 6-9, Z SENSING ELEMENTS
												SENSING ELEMENTS
						0	0					700-1202-021
							1					700-1202-022
							2					700-1202-024
							3					700-1202-028
							4					700-1202-042
							6					700-1202-032
							7					700-1202-020
							9					700-1202-034
						1	1					700-0201-005
							2					700-0201-005 HAST C
							3					700-0201-036
							6					700-0002-360
							7					700-0202-036
							8					700-0001-022
							9					700-0002-023
						Z	Z					SEE SHEET 9 FOR A LIST OF OTHER APPROVED INTEGRAL SENSING ELEMENTS
											e	e = A-F, G, H, J, K, L OR Z
												INSERTION LENGTH/COTE SHIELD LENGTH
											A	6"/2" & 152.4mm/50.8mm
											B	12"/2" & 304.8mm/50.8mm
											C	12"/3.5" & 304.8mm/88.9mm
											D	18"/2" & 457.2mm/50.8mm
											E	18"/3.5" & 457.2mm/88.9mm
											F	18"/10" & 457.2mm/254mm
											G	18"/NO CSL & 457.2mm/NO CSL
											H	36"/10" & 914.4mm/254mm
											J	36"/NO CSL & 914.4mm/NO CSL
											K	48"/10" & 1219.2mm/254mm
											L	60"/10" & 1524mm/254mm
											Z	OTHER
											1	18"/6" & 457.2mm/152.4mm
											2	12"/6" & 304.8mm/152.4mm

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SCALE NONE
UNLESS OTHERWISE STATED ALL DIMENSIONS IN INCHES (MM)

DR. JJS 1-14-09
CK. LEP 6-10-09

CERTIFIED by
PO #
ENG
USER
DE #

NO. 420-0004-173-CD

ISS.	EDO/DSR NO.	APP'D	DATE
8	1-09-106	SGA	1-16-09
7	11-08-100	SGA	3-10-08
6	3-08-105	SGA	3-10-08
5	5-07-113	THP	5-16-07

AMETEK® DREXELBROOK

205 KEITH VALLEY RD
HORSHAM, PA 19044-9986
215-674-1234
FAX 215-674-2731

FM APPROVED INTEGRAL
2-WIRE INTELLIPOINT
MODEL NUMBERING SYSTEM

420-0004-173-CD SHT. 8 OF 15 ISS. 8

SHT 8 OF 15

6.1 FM Control Drawings (Continued)

700-0001-001	700-0002-055	700-0018-126
700-0001-002	700-0002-056	700-0018-134
700-0001-004	700-0002-057	700-0018-144
700-0001-005	700-0002-059	700-0018-222
700-0001-007	700-0002-060	700-0018-226
700-0001-012	700-0002-061	700-0018-234
700-0001-013	700-0002-062	700-0018-242
700-0001-014	700-0002-063	700-0018-243
700-0001-016	700-0002-064	700-0018-245
700-0001-022	700-0002-321	700-0018-246
700-0001-023	700-0002-360	700-0018-262
700-0001-024	700-0003-009	700-0021-001
700-0001-026	700-0004-038	700-0021-002
700-0001-029	700-0004-045	700-0021-003
700-0001-034	700-0004-050	700-0021-007
700-0001-035	700-0005-012	700-0021-008
700-0001-038	700-0005-014	700-0201-005
700-0001-039	700-0005-018	700-0201-008
700-0001-042	700-0005-028	700-0201-009
700-0001-044	700-0005-035	700-0201-010
700-0001-045	700-0005-038	700-0201-015
700-0001-051	700-0005-045	700-0201-016
700-0001-052	700-0005-048	700-0201-018
700-0001-053	700-0005-054	700-0201-025
700-0001-054	700-0005-114	700-0201-026
700-0001-061	700-0005-148	700-0201-035
700-0001-062	700-0005-214	700-0201-036
700-0001-063	700-0005-314	700-0201-105
700-0001-064	700-0005-348	700-0201-108
700-0001-324	700-0005-354	700-0201-109
700-0001-344	700-0005-494	700-0201-118
700-0002-012	700-0005-594	700-0201-135
700-0002-018	700-0008-122	700-0202-002
700-0002-021	700-0008-123	700-0202-004
700-0002-022	700-0008-124	700-0202-019
700-0002-023	700-0008-126	700-0202-023
700-0002-024	700-0008-134	700-0202-024
700-0002-025	700-0008-144	700-0202-033
700-0002-027	700-0008-222	700-0202-036
700-0002-028	700-0008-226	700-0202-043
700-0002-029	700-0008-234	700-0202-102
700-0002-033	700-0008-242	700-0204-038
700-0002-035	700-0008-243	700-0204-045
700-0002-036	700-0008-245	700-0204-048
700-0002-037	700-0008-246	700-0221-002
700-0002-039	700-0008-262	700-1202-001
700-0002-041	700-0009-002	700-1202-018
700-0002-042	700-0009-024	700-1202-020
700-0002-043	700-0011-001	700-1202-021
700-0002-044	700-0011-003	700-1202-022
700-0002-047	700-0011-004	700-1202-024
700-0002-051	700-0011-015	700-1202-028
700-0002-052	700-0018-122	700-1202-032
700-0002-053	700-0018-123	700-1202-034
700-0002-054	700-0018-124	700-1202-041
		700-1202-042

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SCALE NONE
UNLESS OTHERWISE STATED
ALL DIMENSIONS IN INCHES (MM)

DR. JJS 1-14-09
CK. LEP 6-10-09

NO. 420-0004-173-CD

CERTIFIED by
PO #
ENG
USER
DE #

ISS.	EDO/DSR NO.	APP'D	DATE
8	1-09-106	SGA	1-16-09
7	11-08-100	SGA	3-10-08
6	3-08-105	SGA	3-10-08
5	5-07-113	THP	5-16-07

AMETEK® DREXELBROOK
205 KEITH VALLEY RD
HORSHAM, PA 19044-9986
215-674-1234
FAX 215-674-2731

FM APPROVED
ADDITIONAL INTEGRAL
SENSING ELEMENTS

420-0004-173-CD SHT. 9 OF 15 ISS. 8

SHT 9 OF 15

6.1 FM Control Drawings (Continued)

												COLUMNS 9 AND UP DO NOT AFFECT SAFETY
1	2	3	4	5	6	7	8	9	10	11	12	
R	a	T	b	c	O	d	e	*	*	*	f	a = OPTIONS
	a											N = NO-CAL (STD) L = STANDARD AUTO CAL
												M = MANUAL SET POINT ADJUSTMENT T = 10pf AUTO CAL
												H = HI SENSITIVITY V = 10pf FIXED
												G = HI SENSITIVITY MANUAL SET POINT ADJUSTMENT P = HI SENSITIVITY .5pf FIXED
			b									b = OPTIONS ⟨8⟩
			3									(STD)
			7									DUAL SEAL
				c								c = 1-9, A-K CABLE LENGTHS
						d						d = 0-3, 5, 6, OR Z SENSING ELEMENTS
							e					e = 0-9, OR Z SENSING ELEMENTS
												SENSING ELEMENTS
						0	0					700-1202-001
							1					700-1202-012
							2					700-1202-014
							3					700-1202-018
							4					700-1202-041
							6					700-1202-031
							7					700-1202-010
							9					700-1202-033
						1	0					700-0001-018
							1					700-0201-005
							2					700-0201-005 HAST C
							3					700-0201-036
							4					700-0202-002
							5					700-0202-043
							6					700-0002-360
							7					700-0202-036
							8					700-0001-022
							9					700-0002-023
						2	0					700-0209-002
						3	1					700-0029-001
							2					700-0029-002
							3					700-0029-003
							4					700-0029-004
							5					700-0029-005
						5	0					700-0207-001
							1					700-0207-002
							2					700-0207-003
							3					700-0207-004
							4					700-0207-005
							5					700-0207-006
						6	0					700-0204-038
							1					700-0204-002
							2					700-0204-048
						Z	Z					SEE SHEET 11 FOR ADDITIONAL APPROVED REMOTE SENSING ELEMENTS
											f	f = A-F, G, H, J, K, L OR Z
												INSERTION LENGTH/COTE SHIELD LENGTH
											A	6"/2" & 152.4mm/50.8mm
											B	12"/2" & 304.8mm/50.8mm
											C	12"/3.5" & 304.8mm/88.9mm
											D	18"/2" & 457.2mm/50.8mm
											E	18"/3.5" & 457.2mm/88.9mm
											F	18"/10" & 457.2mm/254mm
											G	18"/NO CSL & 457.2mm/NO CSL
											H	36"/10" & 914.4mm/254mm
											J	36"/NO CSL & 914.4mm/NO CSL
											K	48"/10" & 1219.2mm/254mm
											L	60"/10" & 1524mm/254mm
											Z	OTHER
											1	18"/6" & 457.2mm/152.4mm
											2	12"/6" & 304.8mm/152.4mm

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SCALE NONE
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ALL DIMENSIONS IN INCHES (MM)

DR. JJS 1-14-09
CK. LEP 6-10-09

NO. 420-0004-173-CD

CERTIFIED by
PO #
ENG
USER
DE #

ISS.	EDO/DSR NO.	APP'D	DATE
8	1-09-106	SGA	1-16-09
7	11-08-100	SGA	3-10-08
6	3-08-105	SGA	3-10-08
5	5-07-113	THP	5-16-07

AMETEK® DREXELBROOK

205 KEITH VALLEY RD
HORSHAM, PA 19044-9986
215-674-1234
FAX 215-674-2731

FM APPROVED REMOTE
2-WIRE INTELLIPOINT
MODEL NUMBERING SYSTEM

420-0004-173-CD SHT. 10 OF 15 ISS. 8

SHT 10 OF 15

6.1 FM Control Drawings (Continued)

MODEL NUMBERS OF APPROVED REMOTE SENSING ELEMENTS

701-mnop-qrs-t LEVEL PROBE

l = FAMILY NO. 0, 4
m = FAMILY NO. 0 THROUGH 9, BLANK
n = FAMILY NO. 0 THROUGH 9, BLANK
o = 0 THROUGH 9, BLANK
p = 0 THROUGH 9
q = FAMILY NO. 0 THROUGH 9, BLANK
r = FAMILY NO. 0 THROUGH 9, BLANK
s = FAMILY NO. 0 THROUGH 9
t = 14 CHARACTER EXPANDED NUMBERING SYSTEM, DOES NOT AFFECT SAFETY

SCALE NONE
UNLESS OTHERWISE STATED
ALL DIMENSIONS IN INCHES (MM)

DR. JJS 1-14-09
CK. LEP 6-10-09

CERTIFIED by
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ISS.	EDO/DSR NO.	APP'D	DATE
8	1-09-106	SGA	1-16-09
7	11-08-100	SGA	3-10-08
6	3-08-105	SGA	3-10-08
5	5-07-113	THP	5-16-07

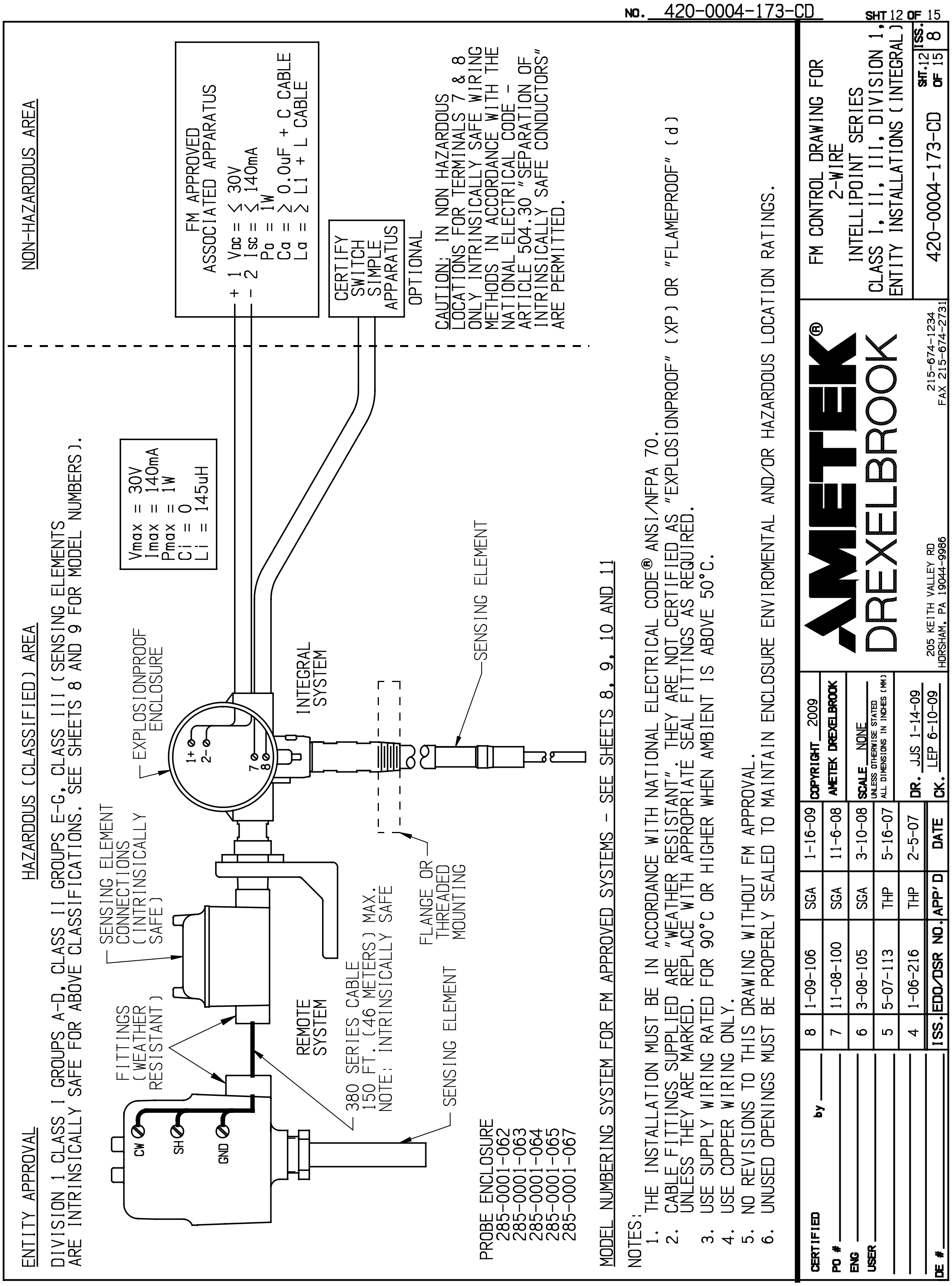
AMETEK® DREXELBROOK
205 KEITH VALLEY RD
HORSHAM, PA 19044-9986
215-674-1234
FAX 215-674-2731

FM APPROVED
ADDITIONAL REMOTE
SENSING ELEMENTS

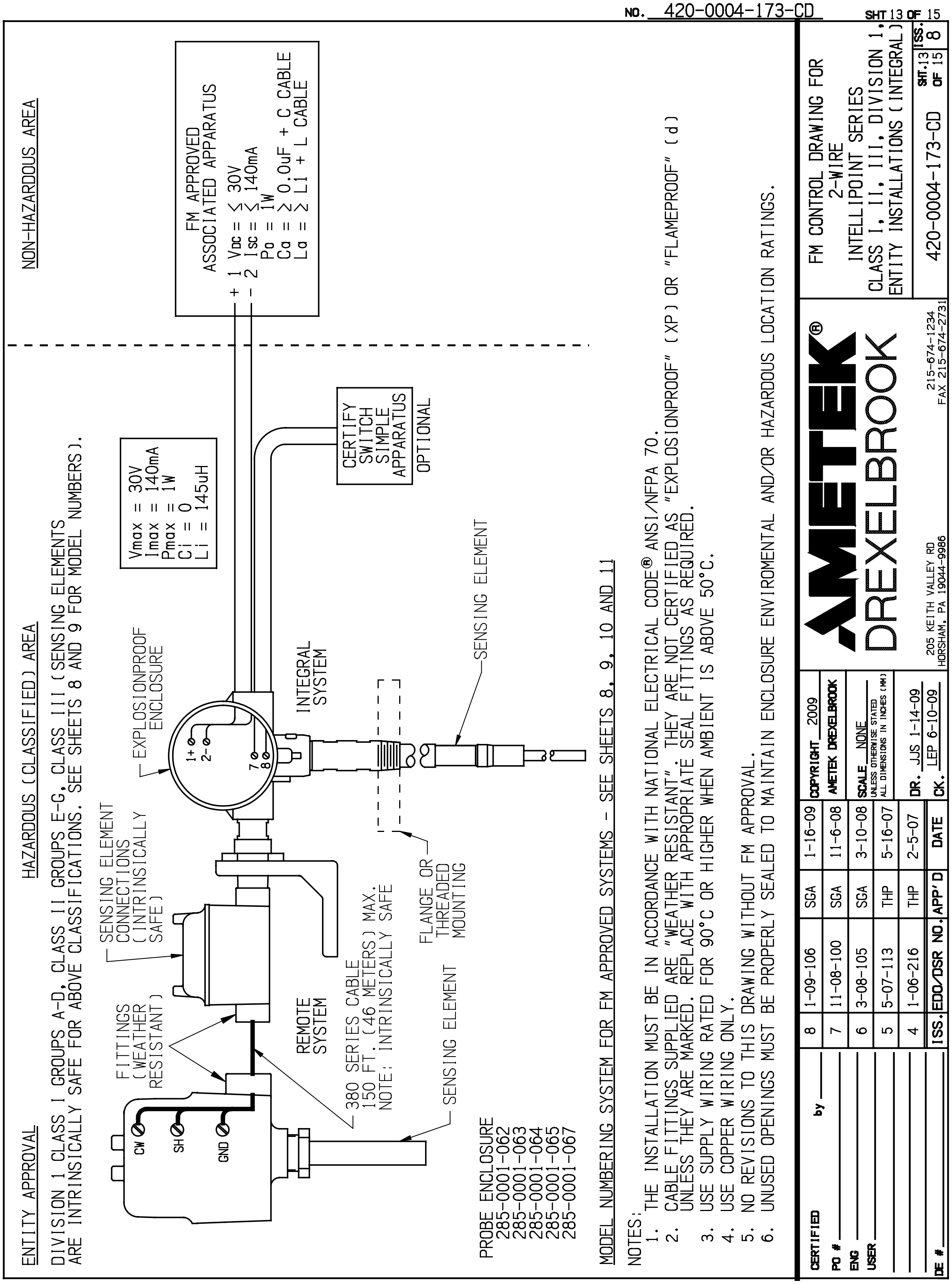
420-0004-173-CD SHT. 11 OF 15 ISS. 8

SHT 11 OF 15

6.1 FM Control Drawings (Continued)



6.1 FM Control Drawings (Continued)



6.1 FM Control Drawings (Continued)

										COLUMNS 11 AND UP DO NOT AFFECT SAFETY				
1	2	3	4	5	6	7	8	9	10	11	12	13	14	
S	a	R	b	T	c	0	0	d	e	*	*	*	f	
	a													a = SIL LEVEL 1 OR 2
			b											b = OPTIONS
														N = NO-CAL (STD) 2pF FIXED L = STANDARD AUTO CAL 2pF AUTO
					c									c = OPTIONS ⟨8⟩
														3 = (STD)
														7 = DUAL SEAL
														C = DUAL SEAL
								d						d = 0, 1 OR Z SENSING ELEMENTS
									e					e = 0-4, 6-9, Z SENSING ELEMENTS
														SENSING ELEMENTS
								0	0					700-1202-021
									1					700-1202-022
									2					700-1202-024
									3					700-1202-028
									4					700-1202-042
									6					700-1202-032
									7					700-1202-020
									9					700-1202-034
								1	1					700-0201-005
									2					700-0201-005 HAST C
									3					700-0201-036
									6					700-0002-360
									7					700-0202-036
									8					700-0001-022
									9					700-0002-023
								Z	Z					SEE SHEET 9 FOR A LIST OF OTHER APPROVED INTEGRAL SENSING ELEMENTS
													f	f = A-F, G, H, J, K, L OR Z
														INSERTION LENGTH/COTE SHIELD LENGTH
													A	6"/2" & 152.4mm/50.8mm
													B	12"/2" & 304.8mm/50.8mm
													C	12"/3.5" & 304.8mm/88.9mm
													D	18"/2" & 457.2mm/50.8mm
													E	18"/3.5" & 457.2mm/88.9mm
													F	18"/10" & 457.2mm/254mm
													G	18"/NO CSL & 457.2mm/NO CSL
													H	36"/10" & 914.4mm/254mm
													J	36"/NO CSL & 914.4mm/NO CSL
													K	48"/10" & 1219.2mm/254mm
													L	60"/10" & 1524mm/254mm
													Z	OTHER
													1	18"/6" & 457.2mm/152.4mm
													2	12"/6" & 304.8mm/152.4mm

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ALL DIMENSIONS IN INCHES (MM)

DR. JJS 1-14-09
CK. LEP 6-10-09

NO. 420-0004-173-CD

CERTIFIED by
PO #
ENG
USER
DE #

ISS.	EDO/DSR NO.	APP'D	DATE
8	1-09-106	SGA	1-16-09
7	11-08-100	SGA	3-10-08
6	3-08-105	SGA	3-10-08
5	5-07-113	THP	5-16-07

AMETEK® DREXELBROOK
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215-674-1234
FAX 215-674-2731

FM APPROVED INTEGRAL
2-WIRE INTELLIPOINT
MODEL NUMBERING SYSTEM
SIL SYSTEMS

420-0004-173-CD SHT. 14 OF 15 ISS. 8

SHT 14 OF 15

6.1 FM Control Drawings (Continued)

										COLUMNS 11 AND UP DO NOT AFFECT SAFETY				
1	2	3	4	5	6	7	8	9	10	11	12	13	14	
S	a	R	b	T	c	d	0	e	f	*	*	*	g	
	a													a = SIL LEVEL 1 OR 2
			b											b = OPTIONS
														N = NO-CAL (STD) 2pF FIXED L = STANDARD AUTO CAL 2pF AUTO
					c									c = OPTIONS ⑧
														3 = (STD)
														7 = DUAL SEAL
						d								d = 1-9, A-K CABLE LENGTHS
								e						e = 0-3, 5, 6, OR Z SENSING ELEMENTS
									f					f = 0-9, OR Z SENSING ELEMENTS
														SENSING ELEMENTS
								0	0					700-1202-001
									1					700-1202-012
									2					700-1202-014
									3					700-1202-018
									4					700-1202-041
									6					700-1202-031
									7					700-1202-010
									9					700-1202-033
								1	0					700-0001-018
									1					700-0201-005
									2					700-0201-005 HAST C
									3					700-0201-036
									4					700-0202-002
									5					700-0202-043
									6					700-0002-360
									7					700-0202-036
									8					700-0001-022
									9					700-0002-023
								2	0					700-0209-002
								3	1					700-0029-001
									2					700-0029-002
									3					700-0029-003
									4					700-0029-004
									5					700-0029-005
								5	0					700-0207-001
									1					700-0207-002
									2					700-0207-003
									3					700-0207-004
									4					700-0207-005
									5					700-0207-006
								6	0					700-0204-038
									1					700-0204-002
									2					700-0204-048
								Z	Z					SEE SHEET 11 FOR ADDITIONAL APPROVED REMOTE SENSING ELEMENTS
													g	g = A-F, G, H, J, K, L OR Z
														INSERTION LENGTH/COTE SHIELD LENGTH
													A	6"/2" & 152.4mm/50.8mm
													B	12"/2" & 304.8mm/50.8mm
													C	12"/3.5" & 304.8mm/88.9mm
													D	18"/2" & 457.2mm/50.8mm
													E	18"/3.5" & 457.2mm/88.9mm
													F	18"/10" & 457.2mm/254mm
													G	18"/NO CSL & 457.2mm/NO CSL
													H	36"/10" & 914.4mm/254mm
													J	36"/NO CSL & 914.4mm/NO CSL
													K	48"/10" & 1219.2mm/254mm
													L	60"/10" & 1524mm/254mm
													Z	OTHER
													1	18"/6" & 457.2mm/152.4mm
													2	12"/6" & 304.8mm/152.4mm

SCALE NONE
UNLESS OTHERWISE STATED ALL DIMENSIONS IN INCHES (MM)
DR. JJS 1-14-09
CK. LEP 6-10-09

CERTIFIED by
PO #
ENG
USER
DE #

NO. 420-0004-173-CD

ISS.	EDO/DSR NO.	APP'D	DATE
8	1-09-106	SGA	1-16-09
7	11-08-100	SGA	3-10-08
6	3-08-105	SGA	3-10-08
5	5-07-113	THP	5-16-07

AMETEK® DREXELBROOK

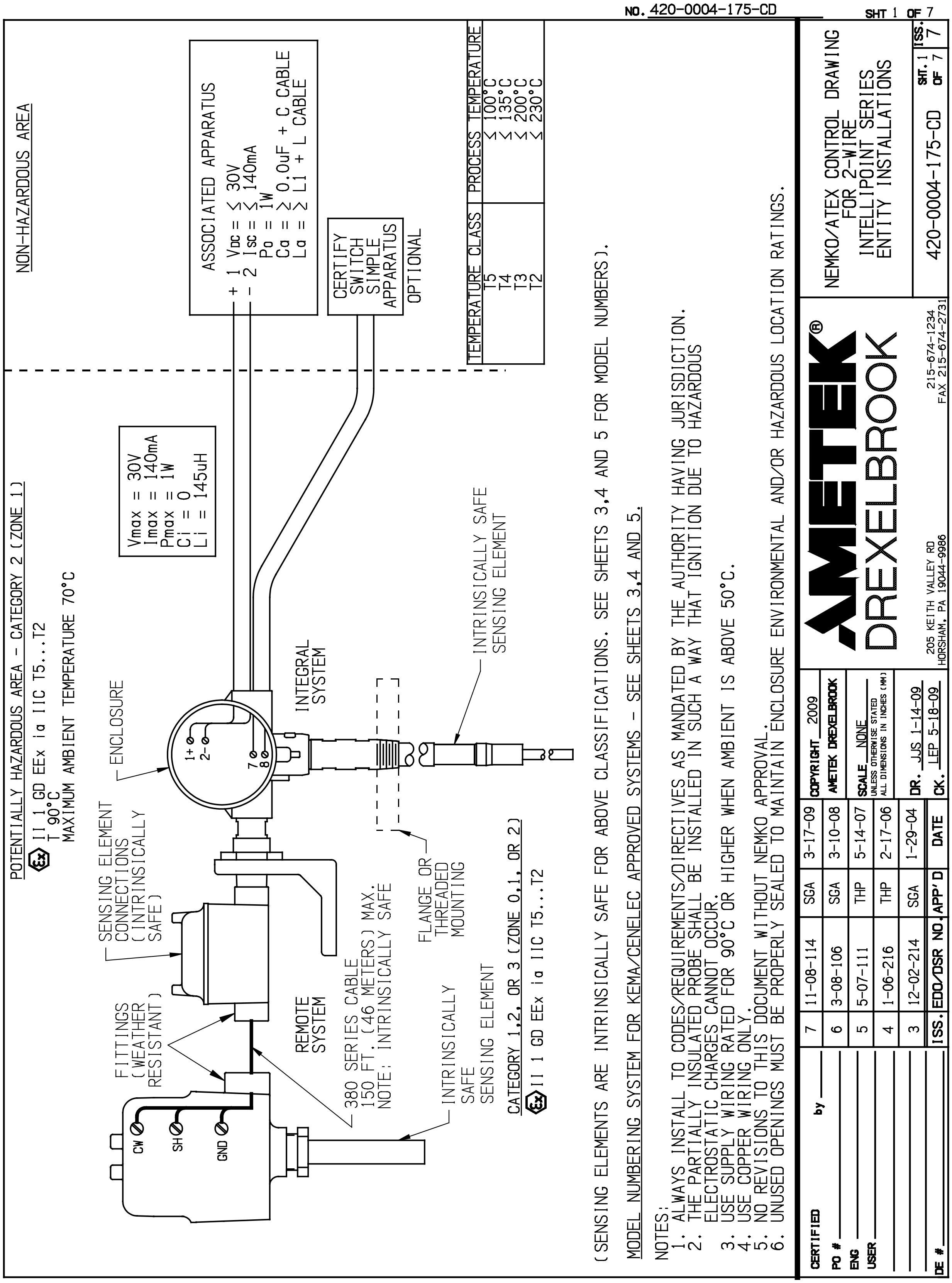
205 KEITH VALLEY RD
HORSHAM, PA 19044-9986
215-674-1234
FAX 215-674-2731

FM APPROVED REMOTE
2-WIRE INTELLIPOINT
MODEL NUMBERING SYSTEM
SIL SYSTEMS

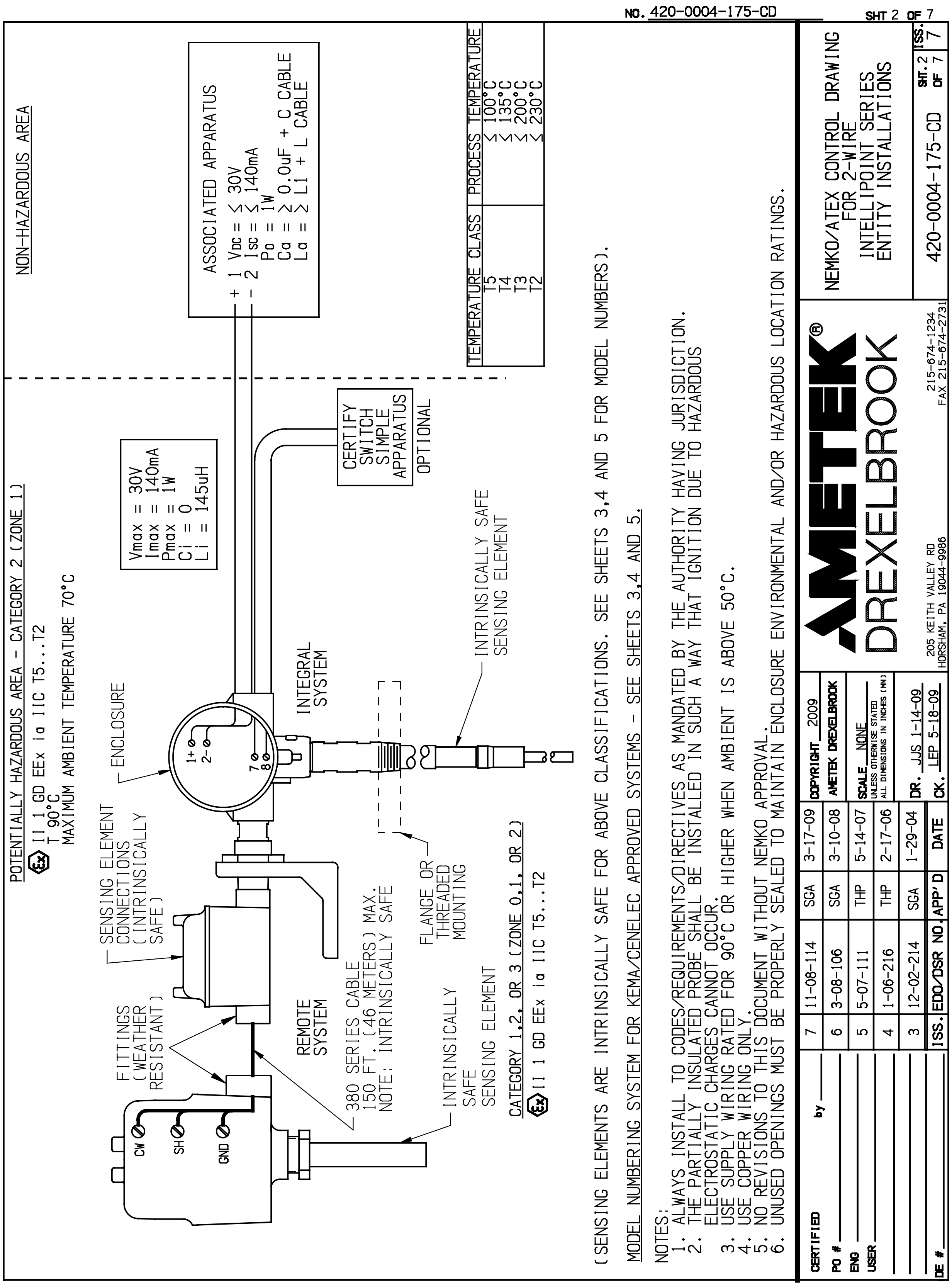
420-0004-173-CD SHT. 15 OF 15 ISS. 8

SHT 15 OF 15

6.2 NEMKO / ATEX Control Drawings



6.2 NEMKO / ATEX Control Drawings (Continued)



6.2 NEMKO / ATEX Control Drawings (Continued)

1	2	3	4	5	6	7	8	9	10	11	12	
R	a	T	b	0	0	0	c	*	*	*	d	
	a											a = OPTIONS
												N = NO CALIBRATION POINT LEVEL L = STANDARD AUTO CAL
												M = MANUAL SET POINT T = 10pf AUTO CAL
												H = HI SENSITIVITY V = 10pf FIXED
												G = MANUAL SET POINT HI SENSITIVITY P = HI SENSITIVITY .5pf FIXED
			b									b = 2
			2									M20 KEMA/CENELEC SYSTEMS
							c					c = 0-4
												SENSING ELEMENTS
						0	0					700-1202-001
							1					700-1202-012
							2					700-1202-014
							3					700-1202-018
							4					700-1202-041
							6					700-1202-032
							7					700-1202-020
							9					700-1202-034
						1	1					700-0201-005 INTRINSICALLY SAFE SENSING ELEMENT
							2					700-0201-005 HAST C INTRINSICALLY SAFE SENSING ELEMENT
							3					700-0201-036 INTRINSICALLY SAFE SENSING ELEMENT
							6					700-0002-360 INTRINSICALLY SAFE SENSING ELEMENT
							7					700-0202-036 INTRINSICALLY SAFE SENSING ELEMENT
							8					700-0001-022 INTRINSICALLY SAFE SENSING ELEMENT
							9					700-0002-023 INTRINSICALLY SAFE SENSING ELEMENT
						Z	Z					SEE SHEET 5 FOR ADDITIONAL APPROVED INTRINSICALLY SAFE SENSING ELEMENTS
									*	*	*	SEE MOUNTING CHART
											d	d = A-F, G, H, J, K, L OR Z
												INSERTION LENGTH/COTE SHIELD LENGTH
											A	6"/2" & 152.4mm/50.8mm
											B	12"/2" & 304.8mm/50.8mm
											C	12"/3.5" & 304.8mm/88.9mm
											D	18"/2" & 457.2mm/50.8mm
											E	18"/3.5" & 457.2mm/88.9mm
											F	18"/10" & 457.2mm/254mm
											G	18"/NO CSL & 457.2mm
											H	36"/10" & 914.4mm/254mm
											J	36"/NO CSL & 914.4mm
											K	48"/10" & 1219.2mm/254mm
											L	60"/10" & 1524mm/254mm
											Z	OTHER
											1	18"/6" & 457.2mm/152.4mm
											2	12"/6" & 304.8mm/152.4mm

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ALL DIMENSIONS IN INCHES (MM)

DR. JJS 1-14-09
LEP 5-18-09

NO. 420-0004-175-CD

CERTIFIED
PO #
ENG
USER
DE #

ISS.	EDO/DSR NO.	APP'D	DATE
7	11-08-114	SGA	3-17-09
6	3-08-106	SGA	3-10-08
5	5-07-111	THP	5-14-07
4	1-06-216	THP	2-17-06

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215-674-1234
FAX 215-674-2731

NEMKO/ATEX APPROVED
2-WIRE INTELLIPOINT
MODEL NUMBERING SYSTEM
(INTEGRAL)

420-0004-175-CD SHT. 3 OF 7 ISS. 7

SHT 3 OF 7

6.2 NEMKO / ATEX Control Drawings (Continued)

												COLUMNS 9 AND UP DO NOT AFFECT SAFETY
1	2	3	4	5	6	7	8	9	10	11	12	
R	a	T	2	b	0	c	d	*	*	*	e	
	a											a = OPTIONS
												N = NO CALIBRATION POINT LEVEL L = STANDARD AUTO CAL
												M = MANUAL SET POINT T = 10pf AUTO CAL
												H = HI SENSITIVITY V = 10pf FIXED
												G = MANUAL SET POINT HI SENSITIVITY P = HI SENSITIVITY .5pf FIXED
				b								b = 1-9, A-K CABLE OPTIONS (REMOTE)
						c						c = 0-3, 5, 6, OR Z SENSING ELEMENTS
							d					d = 0-6, & 8, OR Z SENSING ELEMENTS
												SENSING ELEMENTS
						0	0					700-1202-001
							1					700-1202-012
							2					700-1202-014
							3					700-1202-018
							4					700-1202-041
							6					700-1202-031
							7					700-1202-010
							9					700-1202-033
						1	0					700-0001-018 INTRINSICALLY SAFE SENSING ELEMENT
							1					700-0201-005 INTRINSICALLY SAFE SENSING ELEMENT
							2					700-0201-005 HAST C INTRINSICALLY SAFE SENSING ELEMENT
							3					700-0201-036 INTRINSICALLY SAFE SENSING ELEMENT
							4					700-0202-002 INTRINSICALLY SAFE SENSING ELEMENT
							5					700-0202-043 INTRINSICALLY SAFE SENSING ELEMENT
							6					700-0002-360 INTRINSICALLY SAFE SENSING ELEMENT
							7					700-0202-036 INTRINSICALLY SAFE SENSING ELEMENT
							8					700-0001-022 INTRINSICALLY SAFE SENSING ELEMENT
							9					700-0002-023 INTRINSICALLY SAFE SENSING ELEMENT
						2	0					700-0209-002 INTRINSICALLY SAFE SENSING ELEMENT
						3	1					700-0029-001 INTRINSICALLY SAFE SENSING ELEMENT
							2					700-0029-002 INTRINSICALLY SAFE SENSING ELEMENT
							3					700-0029-003 INTRINSICALLY SAFE SENSING ELEMENT
							4					700-0029-004 INTRINSICALLY SAFE SENSING ELEMENT
							5					700-0029-005 INTRINSICALLY SAFE SENSING ELEMENT
						5	0					700-0207-001 INTRINSICALLY SAFE SENSING ELEMENT
							1					700-0207-002 INTRINSICALLY SAFE SENSING ELEMENT
							2					700-0207-003 INTRINSICALLY SAFE SENSING ELEMENT
							3					700-0207-004 INTRINSICALLY SAFE SENSING ELEMENT
							4					700-0207-005 INTRINSICALLY SAFE SENSING ELEMENT
							5					700-0207-006 INTRINSICALLY SAFE SENSING ELEMENT
						6	0					700-0204-038 INTRINSICALLY SAFE SENSING ELEMENT
						6	1					700-0204-002
						6	2					700-0204-048
						Z	Z					SEE SHEET 5 FOR ADDITIONAL APPROVED INTRINSICALLY SAFE SENSING ELEMENTS
											e	e = A-F, G, H, J, K, L OR Z
												INSERTION LENGTH/COTE SHIELD LENGTH
											A	6"/2" & 152.4mm/50.8mm
											B	12"/2" & 304.8mm/50.8mm
											C	12"/3.5" & 304.8mm/88.9mm
											D	18"/2" & 457.2mm/50.8mm
											E	18"/3.5" & 457.2mm/88.9mm
											F	18"/10" & 457.2mm/254mm
											G	18"/NO CSL & 457.2mm
											H	36"/10" & 914.4mm/254mm
											J	36"/NO CSL & 914.4mm
											K	48"/10" & 1219.2mm/254mm
											L	60"/10" & 1524mm/254mm
											Z	OTHER
											1	18"/6" & 457.2mm/152.4mm
											2	12"/6" & 304.8mm/152.4mm

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SCALE NONE
UNLESS OTHERWISE STATED ALL DIMENSIONS IN INCHES (MM)
DR. JJS 1-14-09
LEP 5-18-09

CERTIFIED
PO #
ENG
USER
DE #

NO. 420-0004-175-CD

ISS.	EDO/DSR NO.	APP'D	DATE
7	11-08-114	SGA	3-17-09
6	3-08-106	SGA	3-10-08
5	5-07-111	THP	5-14-07
4	1-06-216	THP	2-17-06

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FAX 215-674-2731

NEMKO/ATEX APPROVED
2-WIRE INTELLIPOINT
MODEL NUMBERING SYSTEM
(REMOTE)

420-0004-175-CD SHT. 4 OF 7 ISS. 7

SHT 4 OF 7

6.2 NEMKO / ATEX Control Drawings (Continued)

MODEL NUMBERS OF APPROVED INTRINSICALLY SAFE SENSING ELEMENTS

700-mnop-qrs-t LEVEL PROBE

m = FAMILY NO. 0 THROUGH 9, BLANK
n = FAMILY NO. 0 THROUGH 9, BLANK
o = 0 THROUGH 9, BLANK
p = 0 THROUGH 9
q = FAMILY NO. 0 THROUGH 9, BLANK
r = FAMILY NO. 0 THROUGH 9, BLANK
s = FAMILY NO. 0 THROUGH 9
t = 14 CHARACTER EXPANDED NUMBERING SYSTEM, DOES NOT AFFECT SAFETY

SCALE NONE
UNLESS OTHERWISE STATED
ALL DIMENSIONS IN INCHES (MM)

DR. JJS 1-14-09
LEP 5-18-09

NO. 420-0004-175-CD

CERTIFIED
PO #
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DE #

ISS.	EDO/DSR NO.	APP'D	DATE
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5	5-07-111	THP	5-14-07
4	1-06-216	THP	2-17-06

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ADDITIONAL INTRINSICALLY
SAFE SENSING ELEMENTS
(REMOTE)

420-0004-175-CD SHT. 5 OF 7 ISS. 7

SHT 5 OF 7

6.2 NEMKO / ATEX Control Drawings (Continued)

1	2	3	4	5	6	7	8	9	10	11	12	13	14	
S	a	R	b	T	c	0	0	0	d	*	*	*	e	
	a													a = SIL LEVEL 1 OR 2
			b											b = OPTIONS ⟨7⟩
														N = NO CALIBRATION POINT LEVEL 2pF FIXED
														L = STANDARD AUTO CAL 2pF AUTO
					c									c = 2
					2									M20 KEMA/CENELEC SYSTEMS
									d					d = 0-4
														SENSING ELEMENTS
								0	0					700-1202-001
									1					700-1202-012
									2					700-1202-014
									3					700-1202-018
									4					700-1202-041
									6					700-1202-032
									7					700-1202-020
									9					700-1202-034
								1	1					700-0201-005 INTRINSICALLY SAFE SENSING ELEMENT
									2					700-0201-005 HAST C INTRINSICALLY SAFE SENSING ELEMENT
									3					700-0201-036 INTRINSICALLY SAFE SENSING ELEMENT
									6					700-0002-360 INTRINSICALLY SAFE SENSING ELEMENT
									7					700-0202-036 INTRINSICALLY SAFE SENSING ELEMENT
									8					700-0001-022 INTRINSICALLY SAFE SENSING ELEMENT
									9					700-0002-023 INTRINSICALLY SAFE SENSING ELEMENT
								Z	Z					SEE SHEET 5 FOR ADDITIONAL APPROVED INTRINSICALLY SAFE SENSING ELEMENTS
											*	*	*	SEE MOUNTING CHART
													e	e = A-F, G, H, J, K, L OR Z
														INSERTION LENGTH/COTE SHIELD LENGTH
													A	6"/2" & 152.4mm/50.8mm
													B	12"/2" & 304.8mm/50.8mm
													C	12"/3.5" & 304.8mm/88.9mm
													D	18"/2" & 457.2mm/50.8mm
													E	18"/3.5" & 457.2mm/88.9mm
													F	18"/10" & 457.2mm/254mm
													G	18"/NO CSL & 457.2mm
													H	36"/10" & 914.4mm/254mm
													J	36"/NO CSL & 914.4mm
													K	48"/10" & 1219.2mm/254mm
													L	60"/10" & 1524mm/254mm
													Z	OTHER
													1	18"/6" & 457.2mm/152.4mm
													2	12"/6" & 304.8mm/152.4mm

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DR. JJS 1-14-09
LEP 5-18-09

NO. 420-0004-175-CD

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PO #
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DE #

ISS.	EDO/DSR NO.	APP'D	DATE
7	11-08-114	SGA	3-17-09
6	3-08-106	SGA	3-10-08
5	5-07-111	THP	5-14-07
4	1-06-216	THP	2-17-06

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NEMKO/ATEX APPROVED
2-WIRE INTELLIPOINT
MODEL NUMBERING SYSTEM
(INTEGRAL)
SIL SYSTEMS

420-0004-175-CD SHT. 6 OF 7 ISS. 7

SHT 6 OF 7

6.2 NEMKO / ATEX Control Drawings (Continued)

COLUMNS 11 AND UP DO NOT AFFECT SAFETY

1	2	3	4	5	6	7	8	9	10	11	12	13	14	
S	a	R	b	T	2	c	0	d	e	*	*	*	f	
	a													a = SIL LEVEL 1 OR 2
			b											b = OPTIONS ⟨7⟩
														N = NO CALIBRATION POINT LEVEL 2pF FIXED
														L = STANDARD AUTO CAL 2pF AUTO
						c								c = 1-9, A-K CABLE OPTIONS (REMOTE)
								d						d = 0-3, 5, 6, OR Z SENSING ELEMENTS
									e					e = 0-6, & 8, OR Z SENSING ELEMENTS
														SENSING ELEMENTS
								0	0					700-1202-001
									1					700-1202-012
									2					700-1202-014
									3					700-1202-018
									4					700-1202-041
									6					700-1202-031
									7					700-1202-010
									9					700-1202-033
								1	0					700-0001-018 INTRINSICALLY SAFE SENSING ELEMENT
									1					700-0201-005 INTRINSICALLY SAFE SENSING ELEMENT
									2					700-0201-005 HAST C INTRINSICALLY SAFE SENSING ELEMENT
									3					700-0201-036 INTRINSICALLY SAFE SENSING ELEMENT
									4					700-0202-002 INTRINSICALLY SAFE SENSING ELEMENT
									5					700-0202-043 INTRINSICALLY SAFE SENSING ELEMENT
									6					700-0002-360 INTRINSICALLY SAFE SENSING ELEMENT
									7					700-0202-036 INTRINSICALLY SAFE SENSING ELEMENT
									8					700-0001-022 INTRINSICALLY SAFE SENSING ELEMENT
									9					700-0002-023 INTRINSICALLY SAFE SENSING ELEMENT
								2	0					700-0209-002 INTRINSICALLY SAFE SENSING ELEMENT
								3	1					700-0029-001 INTRINSICALLY SAFE SENSING ELEMENT
									2					700-0029-002 INTRINSICALLY SAFE SENSING ELEMENT
									3					700-0029-003 INTRINSICALLY SAFE SENSING ELEMENT
									4					700-0029-004 INTRINSICALLY SAFE SENSING ELEMENT
									5					700-0029-005 INTRINSICALLY SAFE SENSING ELEMENT
								5	0					700-0207-001 INTRINSICALLY SAFE SENSING ELEMENT
									1					700-0207-002 INTRINSICALLY SAFE SENSING ELEMENT
									2					700-0207-003 INTRINSICALLY SAFE SENSING ELEMENT
									3					700-0207-004 INTRINSICALLY SAFE SENSING ELEMENT
									4					700-0207-005 INTRINSICALLY SAFE SENSING ELEMENT
									5					700-0207-006 INTRINSICALLY SAFE SENSING ELEMENT
								6	0					700-0204-038 INTRINSICALLY SAFE SENSING ELEMENT
								6	1					700-0204-002
								6	2					700-0204-048
								Z	Z					SEE SHEET 5 FOR ADDITIONAL APPROVED INTRINSICALLY SAFE SENSING ELEMENTS
													f	f = A-F, G, H, J, K, L OR Z
														INSERTION LENGTH/COTE SHIELD LENGTH
													A	6″/2″ & 152.4mm/50.8mm
													B	12″/2″ & 304.8mm/50.8mm
													C	12″/3.5″ & 304.8mm/88.9mm
													D	18″/2″ & 457.2mm/50.8mm
													E	18″/3.5″ & 457.2mm/88.9mm
													F	18″/10″ & 457.2mm/254mm
													G	18″/NO CSL & 457.2mm
													H	36″/10″ & 914.4mm/254mm
													J	36″/NO CSL & 914.4mm
													K	48″/10″ & 1219.2mm/254mm
													L	60″/10″ & 1524mm/254mm
													Z	OTHER
													1	18″/6″ & 457.2mm/152.4mm
													2	12″/6″ & 304.8mm/152.4mm

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DR. JJS 1-14-09
LEP 5-18-09

NO. 420-0004-175-CD

CERTIFIED
PO #
ENG
USER
DE #

ISS.	EDO/DSR NO.	APP'D	DATE
7	11-08-114	SGA	3-17-09
6	3-08-106	SGA	3-10-08
5	5-07-111	THP	5-14-07
4	1-06-216	THP	2-17-06

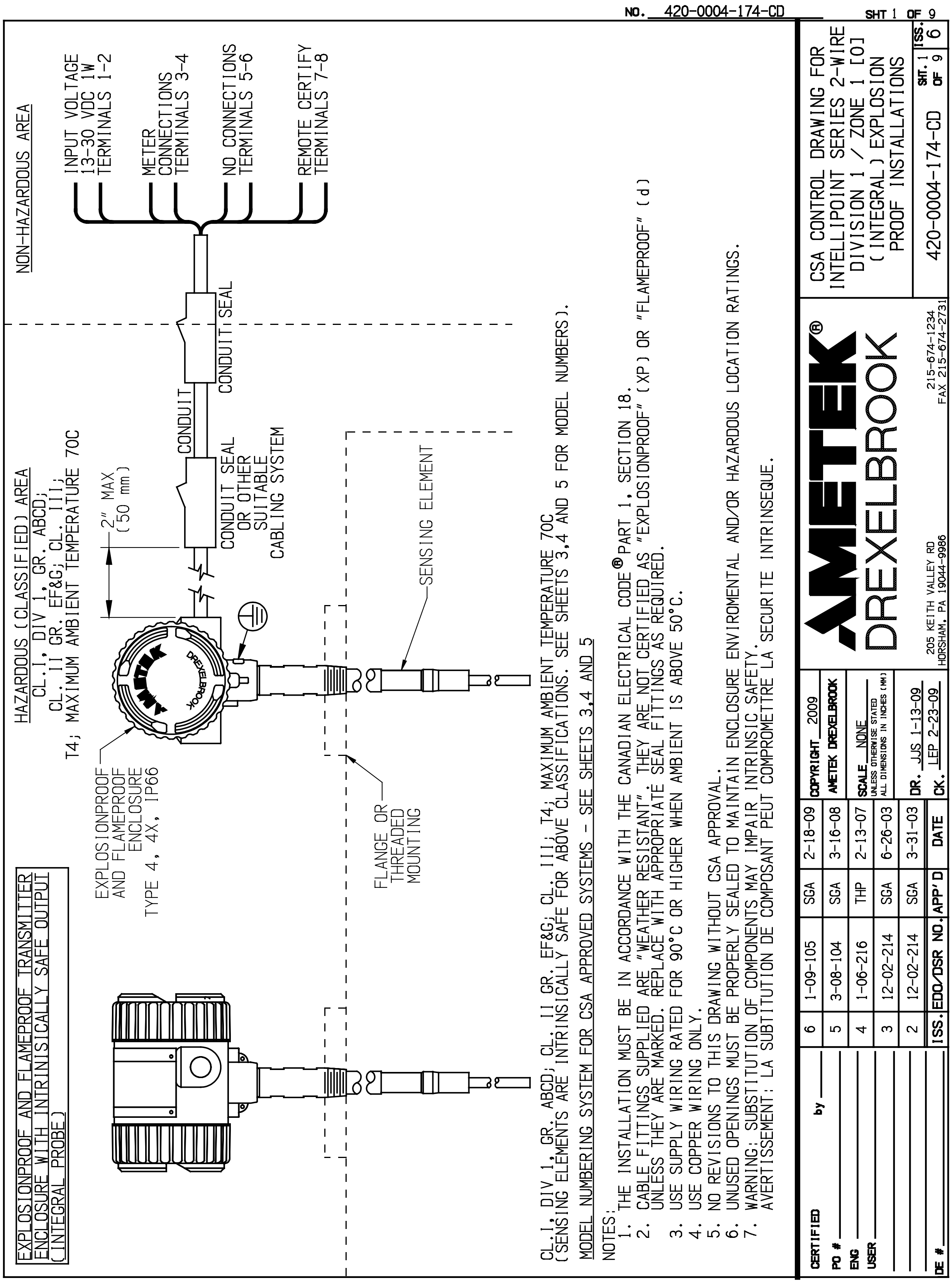
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NEMKO/ATEX APPROVED
2-WIRE INTELLIPOINT
MODEL NUMBERING SYSTEM
(REMOTE)
SIL SYSTEMS

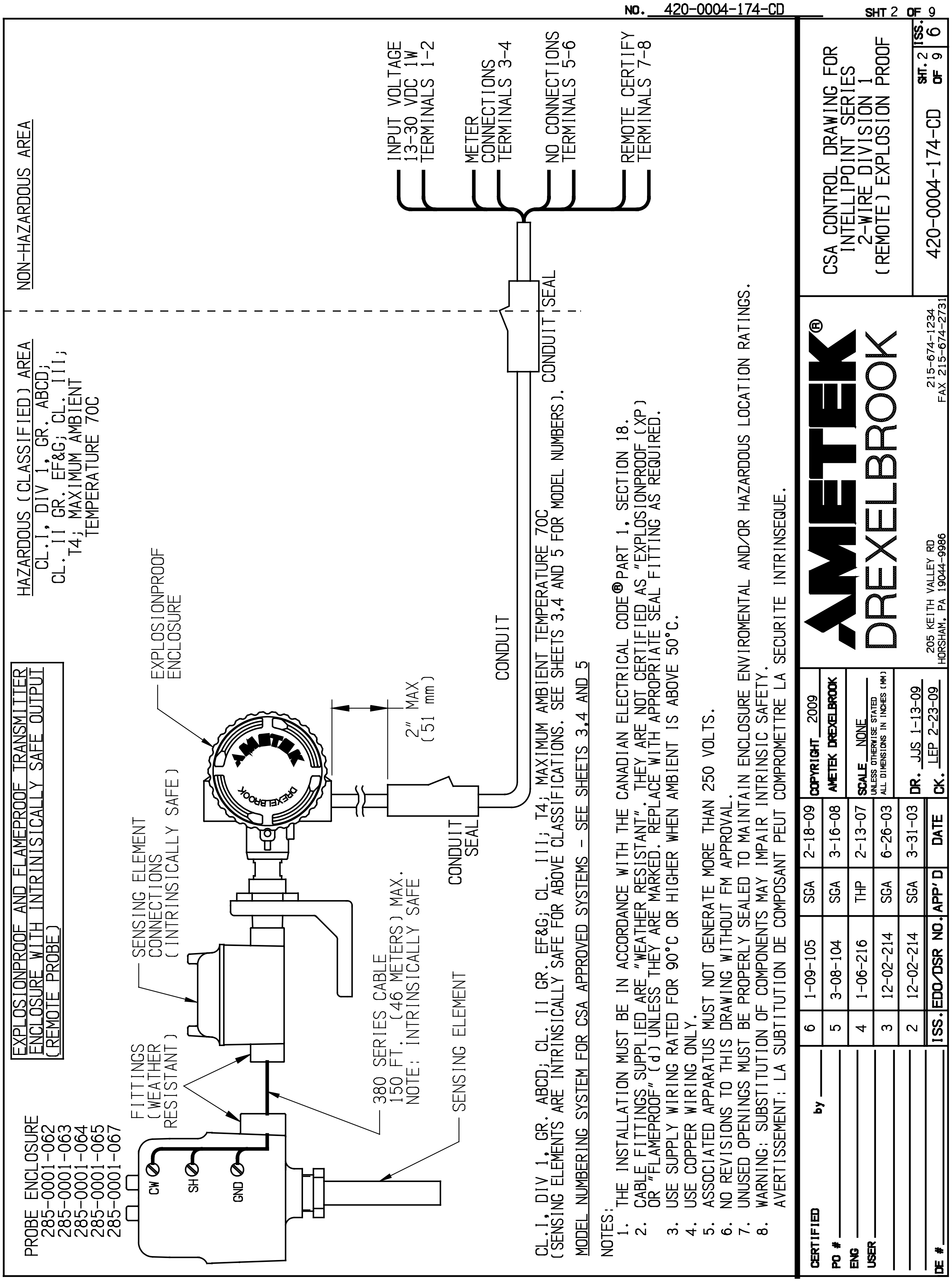
420-0004-175-CD
SHT. 7 OF 7
ISS. 7

SHT 7 OF 7

6.3 CSA Control Drawings



6.3 CSA Control Drawings (Continued)



6.3 CSA Control Drawings (Continued)

1	2	3	4	5	6	7	8	9	10	11	12	
R	a	T	b	0	0	0	c	*	*	*	d	
	a											a = OPTIONS
	N											NO CALIBRATION POINT LEVEL
	M											MANUAL SETPOINT ADJUSTMENT
	H											HI SENSITIVITY
	G											HI SENSITIVITY MANUAL SETPOINT ADJUSTMENT
	L											STANDARD AUTO CAL
	T											10pf AUTO CAL
	V											10pf FIXED
	P											HI SENSITIVITY .5pf FIXED
			b									b = OPTIONS ⟨6⟩
			4									(STD)
			8									DUAL SEAL
			C									DUAL SEAL
							c					c = 0-3
												SENSING ELEMENTS
							0					700-1202-021
							1					700-1202-022
							2					700-1202-024
							3					700-1202-028
								*	*	*		SEE MOUNTING CHART
											d	d = A-F, H, K, L OR Z
												INSERTION LENGTH/COTE SHIELD LENGTH
											A	6"/2" & 152.4mm/50.8mm
											B	12"/2" & 304.8mm/50.8mm
											C	12"/3.5" & 304.8mm/88.9mm
											D	18"/2" & 457.2mm/50.8mm
											E	18"/3.5" & 457.2mm/88.9mm
											F	18"/10" & 457.2mm/254mm
											G	18"/NO CSL & 457.2mm/NO CSL
											H	36"/10" & 914.4mm/254mm
											J	36"/NO CSL & 914.4mm/NO CSL
											K	48"/10" & 1219.2mm/254mm
											L	60"/10" & 1524mm/254mm
											Z	OTHER
											1	18"/6" & 457.2mm/152.4mm
											2	12"/6" & 304.8mm/152.4mm

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ALL DIMENSIONS IN INCHES (MM)

DR. JJS 1-13-09
CK. LEP 2-23-09

NO. 420-0004-174-CD

CERTIFIED by
PO #
ENG
USER
DE #

ISS.	EDO/DSR NO.	APP'D	DATE
6	1-09-105	SGA	2-18-09
5	3-08-104	SGA	3-16-08
4	1-06-216	THP	2-13-07
3	12-02-214	SGA	6-26-03

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CSA APPROVED
INTELLIPOINT 2-WIRE
MODEL NUMBERING SYSTEM
INTEGRAL SYSTEMS

420-0004-174-CD SHT. 3 OF 9 ISS. 6

SHT 3 OF 9

6.3 CSA Control Drawings (Continued)

COLUMNS 9 AND UP DO NOT AFFECT SAFETY

1	2	3	4	5	6	7	8	9	10	11	12	
R	a	T	b	c	4	d	e	*	*	*	f	
	a											a = OPTIONS
	N											NO CALIBRATION
	M											MANUAL SETPOINT
	H											HI SENSITIVITY
	G											HI SENSITIVITY MANUAL SETPOINT
	L											STANDARD AUTO CAL
	T											10pf AUTO CAL
	V											10pf FIXED
	P											HI SENSITIVITY .5pf FIXED
			b									b = OPTIONS ⑥
			4									(STD)
			8									DUAL SEAL
				c								c = 1-9, A-K - CABLE OPTIONS (REMOTE)
						d						d = 0-3, 5, 6, OR Z SENSING ELEMENTS
							e					e = 0-6, & 8, OR Z SENSING ELEMENTS
												SENSING ELEMENTS
						0	0					700-1202-001 FLAMEPROOF SENSING ELEMENT KEMA NO. Ex-00.E.2144 U
							1					700-1202-012 FLAMEPROOF SENSING ELEMENT KEMA NO. Ex-00.E.2144 U
							2					700-1202-014 FLAMEPROOF SENSING ELEMENT KEMA NO. Ex-00.E.2144 U
							3					700-1202-018 FLAMEPROOF SENSING ELEMENT KEMA NO. Ex-00.E.2144 U
							4					700-1202-041 FLAMEPROOF SENSING ELEMENT KEMA NO. Ex-00.E.2144 U
							6					700-1202-031 FLAMEPROOF SENSING ELEMENT KEMA NO. Ex-00.E.2144 U
							7					700-1202-010 FLAMEPROOF SENSING ELEMENT KEMA NO. Ex-00.E.2144 U
							9					700-1202-033 FLAMEPROOF SENSING ELEMENT KEMA NO. Ex-00.E.2144 U
						1	0					700-0001-018 INTRINSICALLY SAFE SENSING ELEMENT
							1					700-0201-005 INTRINSICALLY SAFE SENSING ELEMENT
							2					700-0201-005 HAST C INTRINSICALLY SAFE SENSING ELEMENT
							3					700-0201-036 INTRINSICALLY SAFE SENSING ELEMENT
							4					700-0202-002 INTRINSICALLY SAFE SENSING ELEMENT
							5					700-0202-043 INTRINSICALLY SAFE SENSING ELEMENT
							6					700-0002-360 INTRINSICALLY SAFE SENSING ELEMENT
							7					700-0202-036 INTRINSICALLY SAFE SENSING ELEMENT
							8					700-0001-022 INTRINSICALLY SAFE SENSING ELEMENT
							9					700-0002-023 INTRINSICALLY SAFE SENSING ELEMENT
						2	0					700-0209-002 INTRINSICALLY SAFE SENSING ELEMENT
						3	1					700-0029-001 INTRINSICALLY SAFE SENSING ELEMENT
							2					700-0029-002 INTRINSICALLY SAFE SENSING ELEMENT
							3					700-0029-003 INTRINSICALLY SAFE SENSING ELEMENT
							4					700-0029-004 INTRINSICALLY SAFE SENSING ELEMENT
							5					700-0029-005 INTRINSICALLY SAFE SENSING ELEMENT
						5	0					700-0207-001 INTRINSICALLY SAFE SENSING ELEMENT
							1					700-0207-002 INTRINSICALLY SAFE SENSING ELEMENT
							2					700-0207-003 INTRINSICALLY SAFE SENSING ELEMENT
							3					700-0207-004 INTRINSICALLY SAFE SENSING ELEMENT
							4					700-0207-005 INTRINSICALLY SAFE SENSING ELEMENT
							5					700-0207-006 INTRINSICALLY SAFE SENSING ELEMENT
						6	0					700-0204-038 INTRINSICALLY SAFE SENSING ELEMENT
							1					700-0204-002 INTRINSICALLY SAFE SENSING ELEMENT
							2					700-0204-048 INTRINSICALLY SAFE SENSING ELEMENT
						Z	Z					SEE SHEET 4 FOR ADDITIONAL APPROVED INTRINSICALLY SAFE SENSING ELEMENTS
											f	f = A-F, H, K, L OR Z
												INSERTION LENGTH/COTE SHIELD LENGTH
											A	6"/2" & 152.4mm/50.8mm
											B	12"/2" & 304.8mm/50.8mm
											C	12"/3.5" & 304.8mm/88.9mm
											D	18"/2" & 457.2mm/50.8mm
											E	18"/3.5" & 457.2mm/88.9mm
											F	18"/10" & 457.2mm/254mm
											G	18"/NO CSL & 457.2mm/NO CSL
											H	36"/10" & 914.4mm/254mm
											J	36"/NO CSL & 914.4mm/NO CSL
											K	48"/10" & 1219.2mm/254mm
											L	60"/10" & 1524mm/254mm
											Z	OTHER
											1	18"/6" & 457.2mm/152.4mm
											2	12"/6" & 304.8mm/152.4mm

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SCALE NONE
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ALL DIMENSIONS IN INCHES (MM)

DR. JJS 1-13-09
CK. LEP 2-23-09

NO. 420-0004-174-CD

CERTIFIED by
PO #
ENG
USER
DE #

ISS.	EDO/DSR NO.	APP'D	DATE
6	1-09-105	SGA	2-18-09
5	3-08-104	SGA	3-16-08
4	1-06-216	THP	2-13-07
3	12-02-214	SGA	6-26-03

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CSA APPROVED
2-WIRE INTELLIPOINT
MODEL NUMBERING SYSTEM
(REMOTE)

420-0004-174-CD SHT. 4 OF 9 ISS. 6

SHT 4 OF 9

6.3 CSA Control Drawings (Continued)

MODEL NUMBERS OF APPROVED INTRINSICALLY SAFE SENSING ELEMENTS

700-mnop-qrs-t LEVEL PROBE

m = FAMILY NO. 0 THROUGH 9, BLANK
n = FAMILY NO. 0 THROUGH 9, BLANK
o = 0 THROUGH 9, BLANK
p = 0 THROUGH 9
q = FAMILY NO. 0 THROUGH 9, BLANK
r = FAMILY NO. 0 THROUGH 9, BLANK
s = FAMILY NO. 0 THROUGH 9
t = 14 CHARACTER EXPANDED NUMBERING SYSTEM, DOES NOT AFFECT SAFETY

SCALE NONE
UNLESS OTHERWISE STATED
ALL DIMENSIONS IN INCHES (MM)
DR. JJS 1-13-09
CK. LEP 2-23-09

NO. 420-0004-174-CD

CERTIFIED by
PO #
ENG
USER
DE #

ISS.	EDO/DSR NO.	APP'D	DATE
6	1-09-105	SGA	2-18-09
5	3-08-104	SGA	3-16-08
4	1-06-216	THP	2-13-07
3	12-02-214	SGA	6-26-03

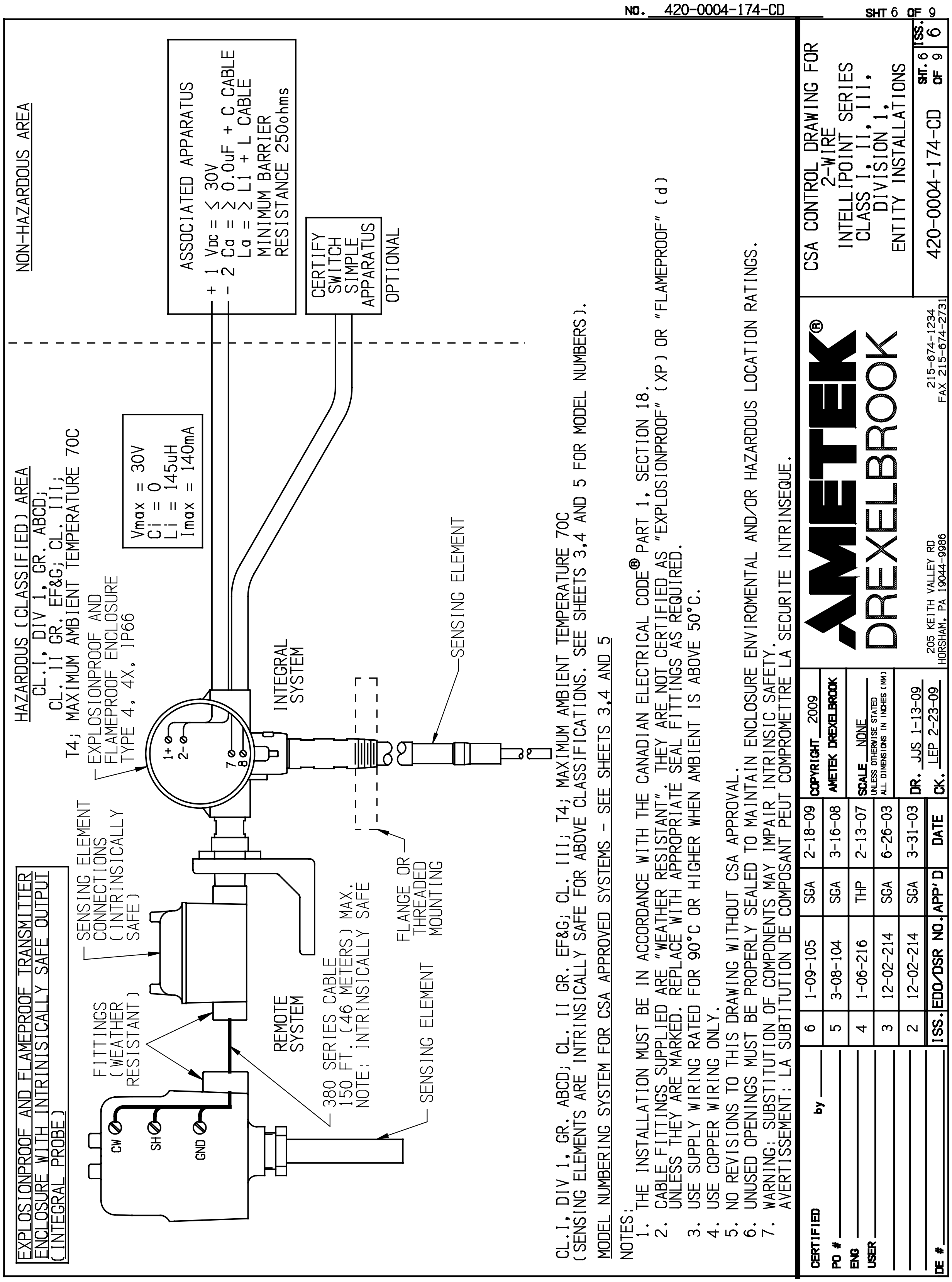
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215-674-1234
FAX 215-674-2731

CSA APPROVED
ADDITIONAL INTRINSICALLY
SAFE SENSING ELEMENTS
(REMOTE)

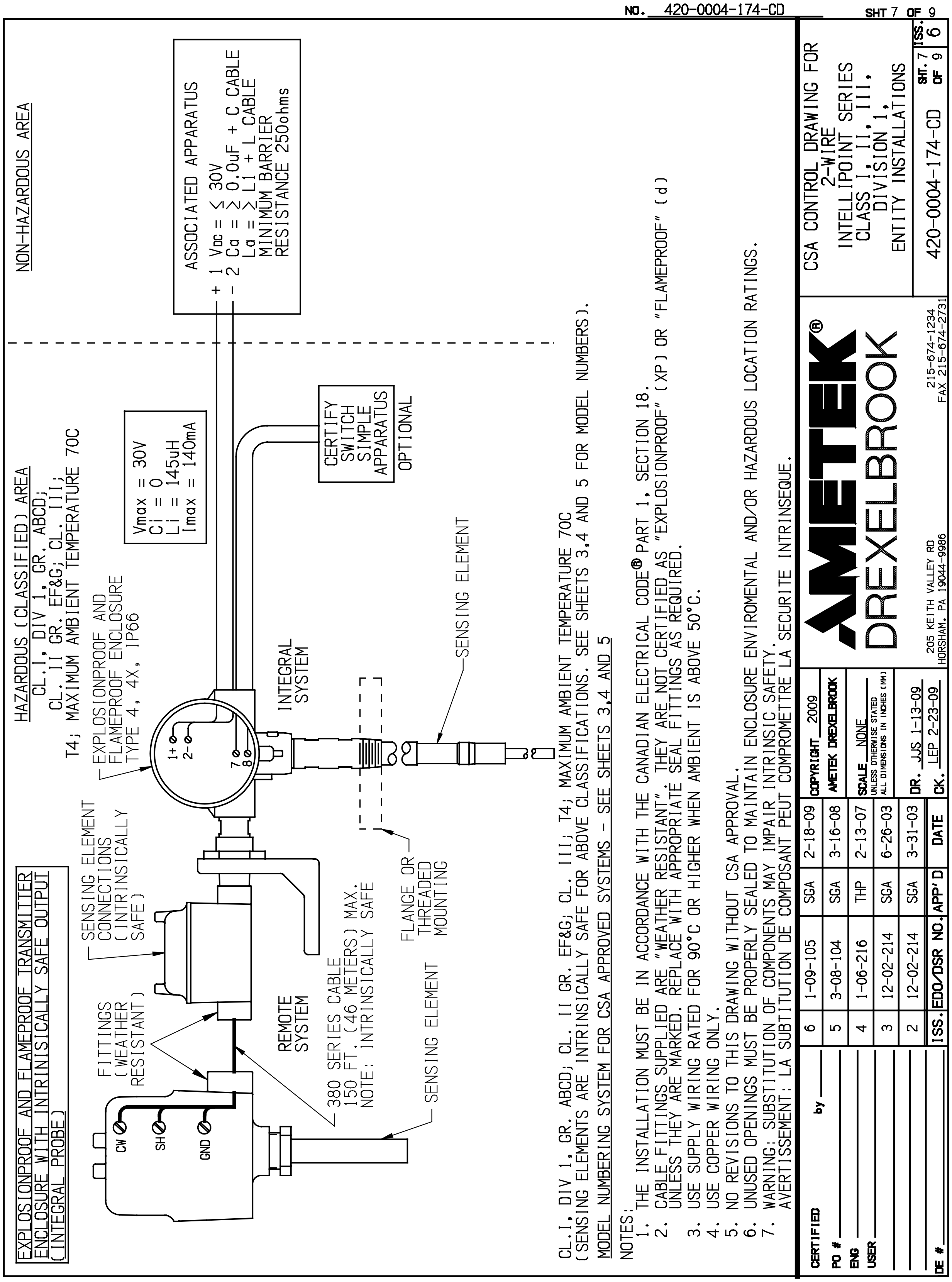
420-0004-174-CD SHT. 5 OF 9 ISS. 6

SHT 5 OF 9

6.3 CSA Control Drawings (Continued)



6.3 CSA Control Drawings (Continued)



6.3 CSA Control Drawings (Continued)

1	2	3	4	5	6	7	8	9	10	11	12	13	14	
S	a	R	b	T	c	0	0	0	d	*	*	*	e	
	a													a = SIL LEVEL 1 OR 2
			b											b = OPTIONS
			N											NO CALIBRATION POINT LEVEL 2pF FIXED
			L											STANDARD AUTO CAL 2pF AUTO
					c									c = OPTIONS ⟨6⟩
					4									(STD)
					8									DUAL SEAL
					C									DUAL SEAL
														3/4" NPT CSA SYSTEMS
									d					d = 0-3
														SENSING ELEMENTS
									0					700-1202-021
									1					700-1202-022
									2					700-1202-024
									3					700-1202-028
										*	*	*		SEE MOUNTING CHART
													e	e = A-F, H, K, L OR Z
														INSERTION LENGTH/COTE SHIELD LENGTH
													A	6"/2" & 152.4mm/50.8mm
													B	12"/2" & 304.8mm/50.8mm
													C	12"/3.5" & 304.8mm/88.9mm
													D	18"/2" & 457.2mm/50.8mm
													E	18"/3.5" & 457.2mm/88.9mm
													F	18"/10" & 457.2mm/254mm
													G	18"/NO CSL & 457.2mm/NO CSL
													H	36"/10" & 914.4mm/254mm
													J	36"/NO CSL & 914.4mm/NO CSL
													K	48"/10" & 1219.2mm/254mm
													L	60"/10" & 1524mm/254mm
													Z	OTHER
													1	18"/6" & 457.2mm/152.4mm
													2	12"/6" & 304.8mm/152.4mm

SCALE NONE
UNLESS OTHERWISE STATED
ALL DIMENSIONS IN INCHES (MM)

DR. JJS 1-14-09
CK. LEP 2-23-09

NO. 420-0004-174-CD

CERTIFIED by
PO #
ENG
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DE #

ISS.	EDO/DSR NO.	APP'D	DATE
6	1-09-105	SGA	2-18-09
5	3-08-104	SGA	3-16-08
4	1-06-216	THP	2-13-07
3	12-02-214	SGA	6-26-03

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215-674-1234
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CSA APPROVED
INTELLIPOINT 2-WIRE
MODEL NUMBERING SYSTEM
INTEGRAL SYSTEMS
SIL SYSTEM

420-0004-174-CD SHT. 8 OF 9 ISS. 6

SHT 8 OF 9

6.3 CSA Control Drawings (Continued)

COLUMNS 11 AND UP DO NOT AFFECT SAFETY

1	2	3	4	5	6	7	8	9	10	11	12	13	14	
S	a	R	b	T	c	d	4	e	f	*	*	*	g	
	a													a = SIL LEVEL 1 OR 2
			b											b = OPTIONS
			N											NO CALIBRATION 2pF FIXED
			L											STANDARD AUTO CAL 2pF AUTO
				c										c = OPTIONS 6
				4										(STD)
				8										DUAL SEAL
						d								d = 1-9, A-K - CABLE OPTIONS (REMOTE)
								e						e = 0-3, 5, 6, OR Z SENSING ELEMENTS
									f					f = 0-6, & 8, OR Z SENSING ELEMENTS
														SENSING ELEMENTS
								0	0					700-1202-001 FLAMEPROOF SENSING ELEMENT KEMA NO. Ex-00.E.2144 U
									1					700-1202-012 FLAMEPROOF SENSING ELEMENT KEMA NO. Ex-00.E.2144 U
									2					700-1202-014 FLAMEPROOF SENSING ELEMENT KEMA NO. Ex-00.E.2144 U
									3					700-1202-018 FLAMEPROOF SENSING ELEMENT KEMA NO. Ex-00.E.2144 U
									4					700-1202-041 FLAMEPROOF SENSING ELEMENT KEMA NO. Ex-00.E.2144 U
									6					700-1202-031 FLAMEPROOF SENSING ELEMENT KEMA NO. Ex-00.E.2144 U
									7					700-1202-010 FLAMEPROOF SENSING ELEMENT KEMA NO. Ex-00.E.2144 U
									9					700-1202-033 FLAMEPROOF SENSING ELEMENT KEMA NO. Ex-00.E.2144 U
								1	0					700-0001-018 INTRINSICALLY SAFE SENSING ELEMENT
									1					700-0201-005 INTRINSICALLY SAFE SENSING ELEMENT
									2					700-0201-005 HAST C INTRINSICALLY SAFE SENSING ELEMENT
									3					700-0201-036 INTRINSICALLY SAFE SENSING ELEMENT
									4					700-0202-002 INTRINSICALLY SAFE SENSING ELEMENT
									5					700-0202-043 INTRINSICALLY SAFE SENSING ELEMENT
									6					700-0002-360 INTRINSICALLY SAFE SENSING ELEMENT
									7					700-0202-036 INTRINSICALLY SAFE SENSING ELEMENT
									8					700-0001-022 INTRINSICALLY SAFE SENSING ELEMENT
									9					700-0002-023 INTRINSICALLY SAFE SENSING ELEMENT
								2	0					700-0209-002 INTRINSICALLY SAFE SENSING ELEMENT
								3	1					700-0029-001 INTRINSICALLY SAFE SENSING ELEMENT
									2					700-0029-002 INTRINSICALLY SAFE SENSING ELEMENT
									3					700-0029-003 INTRINSICALLY SAFE SENSING ELEMENT
									4					700-0029-004 INTRINSICALLY SAFE SENSING ELEMENT
									5					700-0029-005 INTRINSICALLY SAFE SENSING ELEMENT
								5	0					700-0207-001 INTRINSICALLY SAFE SENSING ELEMENT
									1					700-0207-002 INTRINSICALLY SAFE SENSING ELEMENT
									2					700-0207-003 INTRINSICALLY SAFE SENSING ELEMENT
									3					700-0207-004 INTRINSICALLY SAFE SENSING ELEMENT
									4					700-0207-005 INTRINSICALLY SAFE SENSING ELEMENT
									5					700-0207-006 INTRINSICALLY SAFE SENSING ELEMENT
								6	0					700-0204-038 INTRINSICALLY SAFE SENSING ELEMENT
									1					700-0204-002 INTRINSICALLY SAFE SENSING ELEMENT
									2					700-0204-048 INTRINSICALLY SAFE SENSING ELEMENT
								Z	Z					SEE SHEET 4 FOR ADDITIONAL APPROVED INTRINSICALLY SAFE SENSING ELEMENTS
													g	g = A-F, H, K, L OR Z
														INSERTION LENGTH/COTE SHIELD LENGTH
													A	6"/2" & 152.4mm/50.8mm
													B	12"/2" & 304.8mm/50.8mm
													C	12"/3.5" & 304.8mm/88.9mm
													D	18"/2" & 457.2mm/50.8mm
													E	18"/3.5" & 457.2mm/88.9mm
													F	18"/10" & 457.2mm/254mm
													G	18"/NO CSL & 457.2mm/NO CSL
													H	36"/10" & 914.4mm/254mm
													J	36"/NO CSL & 914.4mm/NO CSL
													K	48"/10" & 1219.2mm/254mm
													L	60"/10" & 1524mm/254mm
													Z	OTHER
													1	18"/6" & 457.2mm/152.4mm
													2	12"/6" & 304.8mm/152.4mm

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SCALE NONE
UNLESS OTHERWISE STATED ALL DIMENSIONS IN INCHES (MM)

DR. JJS 1-13-09
CK. LEP 2-23-09

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DE #

NO. 420-0004-174-CD

ISS.	EDO/DSR NO.	APP'D	DATE
6	1-09-105	SGA	2-18-09
5	3-08-104	SGA	3-16-08
4	1-06-216	THP	2-13-07
3	12-02-214	SGA	6-26-03

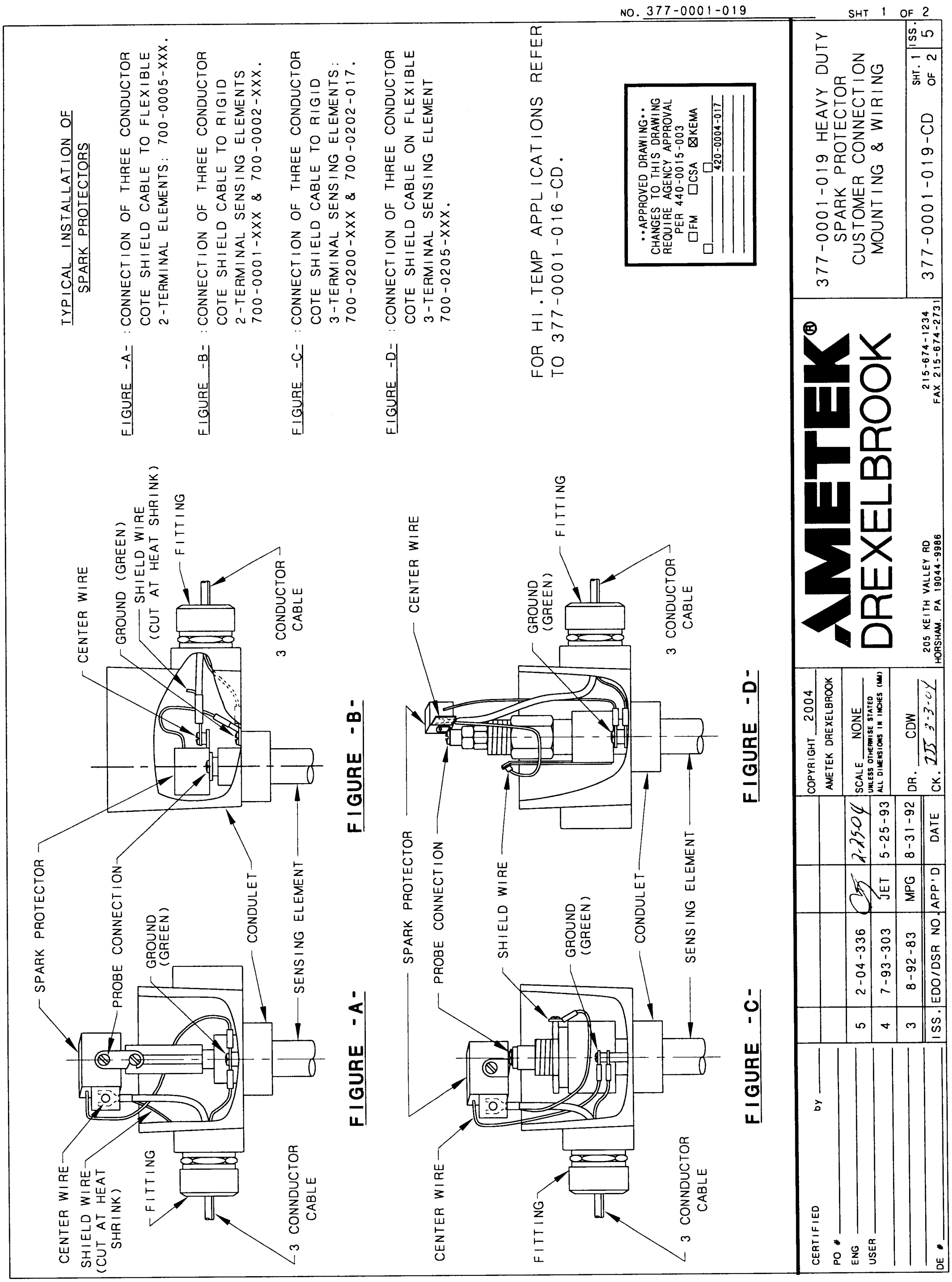
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CSA APPROVED
2-WIRE INTELLIPOINT
MODEL NUMBERING SYSTEM
(REMOTE)
SIL SYSTEMS

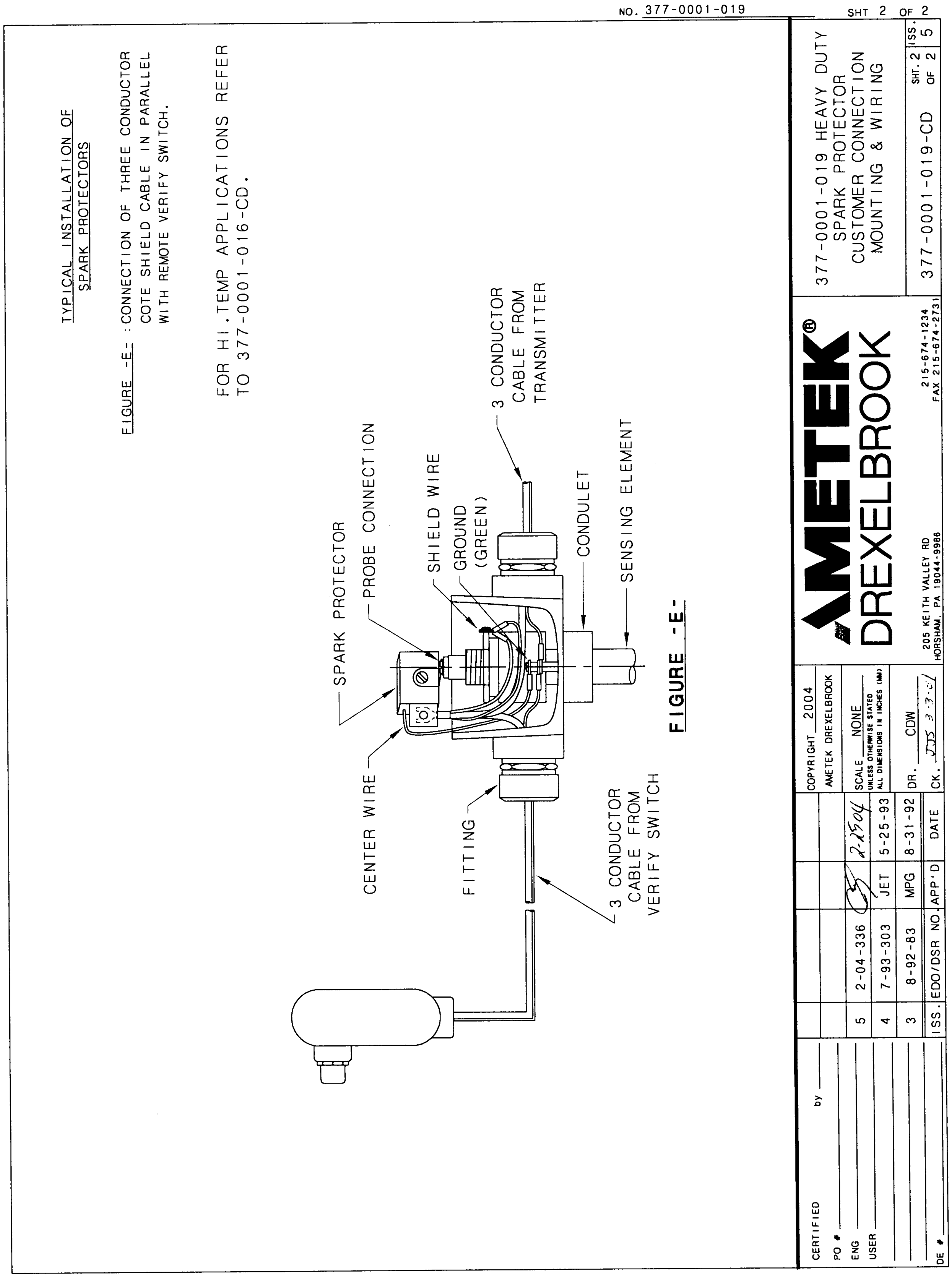
420-0004-174-CD SHT. 9 OF 9 ISS. 6

SHT 9 OF 9

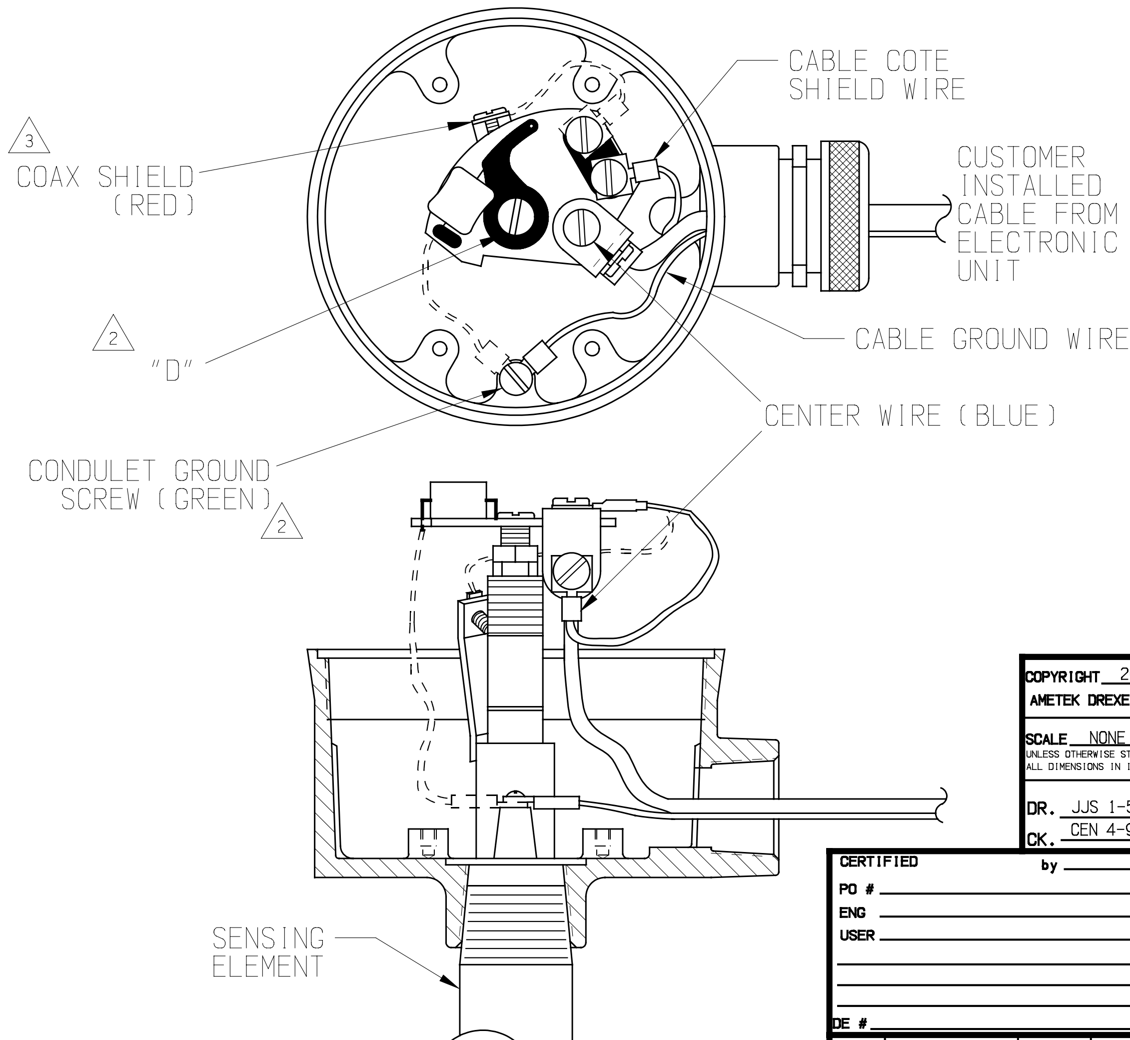
6.4 Mounting and Wiring for Spark Protector Drawings



6.4 Mounting and Wiring for Spark Protector (Continued)



6.4 Mounting and Wiring for Spark Protector (Continued)



NOTES:
1. SPARK PROTECTOR IS SHOWN ON A 303-0029-10X PROBE. IT CAN BE INSTALLED ON OTHER COTE SHIELD PROBES IN THE SAME MANNER.
2. SPARK PROTECTOR IS MOUNTED IN CONDULET WITH LAND SIDE UP. CENTER ROD OF SENSING ELEMENT CONNECTION IS THROUGH HOLE "D". RING LUG IS ATTACHED TO GROUND SCREW (GREEN) BY D.E.
3. D.E. INSTALLED JUMPER WIRE 353-0002-047 TO JUMPER SHIELD OF PROBE TO SPARK PROTECTOR. RING LUG END GOES TO THE PROBE, SPADE LUG END GOES TO SPARK PROTECTOR PCB.
4. TEMPERATURE RANGE: -55°C TO +125°C.
5. ALL DASHED WIRES ARE FACTORY INSTALLED.

SCALE NONE
UNLESS OTHERWISE STATED
ALL DIMENSIONS IN INCHES (MM)

DR. JJS 1-5-07
CK. CEN 4-9-07

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ISS.	EDO/DSR NO.	APP'D	DATE
4	12-06-106	JEN	3-13-07
3	1-01-304	JET	5-18-01
2	6-99-246	DL	8-16-99
1	4-99-303	JET	6-10-99
A	1-80-221	——	2-21-80

NO. 377-0001-016-CD

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MOUNTING AND WIRING FOR
SPARK PROTECTOR
377-0001-016

SHT 1 OF 1

377-0001-016-CD SHT. 1 OF 1 ISS. 4

6.5 Adding a Padded Capacitor

NO. 330-0009-022-CD SHT 1 OF 3

ADDING A PADDED CAPACITOR:
THE TUNING RANGE OF EACH POINT LEVEL SWITCH IS LIMITED. LONG INSERTION LENGTH SENSING ELEMENTS OR SENSING ELEMENTS MOUNTED IN PIPES OR NEAR METAL OBJECTS MAY GENERATE ENOUGH STANDING CAPACITANCE TO EXCEED THE THE TUNING RANGE OF THE SWITCH.

THE ADDITION OF AN EXTERNAL PADDING CAPACITOR WILL INCREASE THE TUNING RANGE OF THE UNIT. TUNING RANGES AND EXAMPLES OF INCREASES CAN BE FOUND FOR EACH TYPE OF POINT LEVEL ELECRONIC SWITCH ON SHEET THREE.

WHEN A PADDING CAPACITOR IS REQUIRED, AN NPO CAPACITOR SHOULD BE ADDED TO THE PADDING TERMINALS AS INDICATED ON SHEET 2. ADDITIONAL PADS CAN BE ADDED IN PARALLEL UNIT A SATISFACTORY TUNING RANGE IS REACHED. IF A TUNING RANGE CANNOT BE REACHED, OR, IF PADDING IS IN EXCESS OF THE MAXIMUM RECOMMENDED TUNING RANGE AS INDICATED IN THE TABLE ON SHEET 3, PLEASE CONTACT THE FACTORY SERVICE DEPARTMENT.

NOTE: ON SOME TRANSMITTERS, THE PAD CAPACITOR IS SOLDERED TO TURRETS. OTHER TRANSMITTERS ATTACH THE LEADS UNDER SCREWS.

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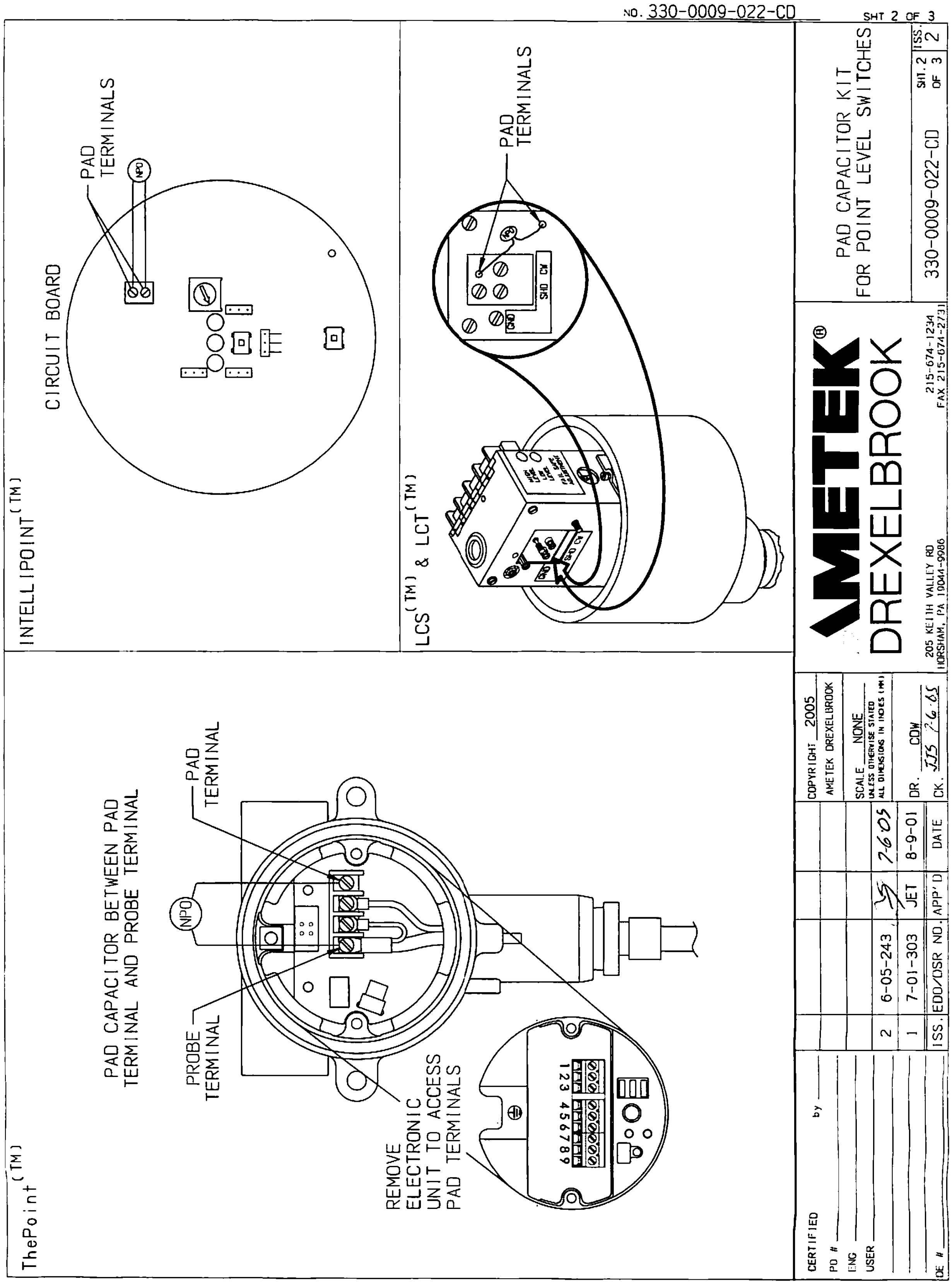
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2	6-05-243	[signature]	7-6-05
1	7-01-303	JET	8-9-01

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SCALE NONE
UNLESS OTHERWISE STATED ALL DIMENSIONS IN INCHES (MM)
DR. CDW
CK. JJS 7-6-05

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PAD CAPACITOR KIT FOR POINT LEVEL SWITCHES
330-0009-022-CD SHT. 1 OF 3 ISS. 2

6.5 Adding a Padded Capacitor (Continued)



6.5 Adding a Padded Capacitor (Continued)

NO. 330-0009-022-CD

PRODUCT	Sensitivity	Model Numbers	Un-padded Tuning Range	Padding Ratio	Padding Example	Max recommended tuning range
ThePoint™ Line Powered	High	PHL, PPL, PGL	0 to 25pF	1:3	Adding a 10pF cap will change the range to 3pF to 28pF	50 to 75pF
ThePoint™ Line Powered	Standard	PNL, PLL, PTL, PVL, PML	0 to 60pF	1:3	Adding a 10pF cap will change the range to 3pF to 63pF	120 to 180pF
ThePoint™ Two Wire	High	PHT, PPT, PGT	0 to 25pF	1:1	Adding a 10pF cap will change the range to 10 to 35pF	50 to 75pF
ThePoint™ Two Wire	Standard	PNT, PLT, PTT, PVT, PMT	0 to 60pF	1:1	Adding a 10pF cap will change the range to 10 to 70pF	120 to 180pF
Intellipoint™ (Line Powered and Two Wire)	High	RHL, RPL, RGL RHT, RPT, RGT	0 to 25pF	4.33:1	Adding a 10pF cap will change the range to 43pF to 68pF	50 to 75pF
Intellipoint™ (Line Powered and Two Wire)	Standard	RNL, RLL, RTL, RVL, RML RNT, RLT, RTT, RVT, RMT	0 to 100pF	4.33:1	Adding a 10pF cap will change the range to 43pF to 143pF	200 to 300pF
LCS	High	406-6020, 406-6022	0 to 8pF	1:1	Adding a 10pF cap will change the range to 10 to 18pF	16 to 24pF
LCS	Standard	406-6000, 406-6002	0 to 90pF	3:1	Adding a 10pF cap will change the range to 30 to 120pF	180 to 270pF
LCT	High	406-6220, 406-6222	0 to 8pF	1:1	Adding a 10pF cap will change the range to 10 to 18pF	16 to 24pF
LCT	Standard	406-6200, 406-6202	0 to 90 pF	3:1	Adding a 10pF cap will change the range to 30 to 120pF	180 to 270pF

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2	6-05-243	[signature]	7-6-05
1	7-01-303	JET	8-9-01

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SCALE NONE
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DR. CDW
CK. JJS 7-6-05

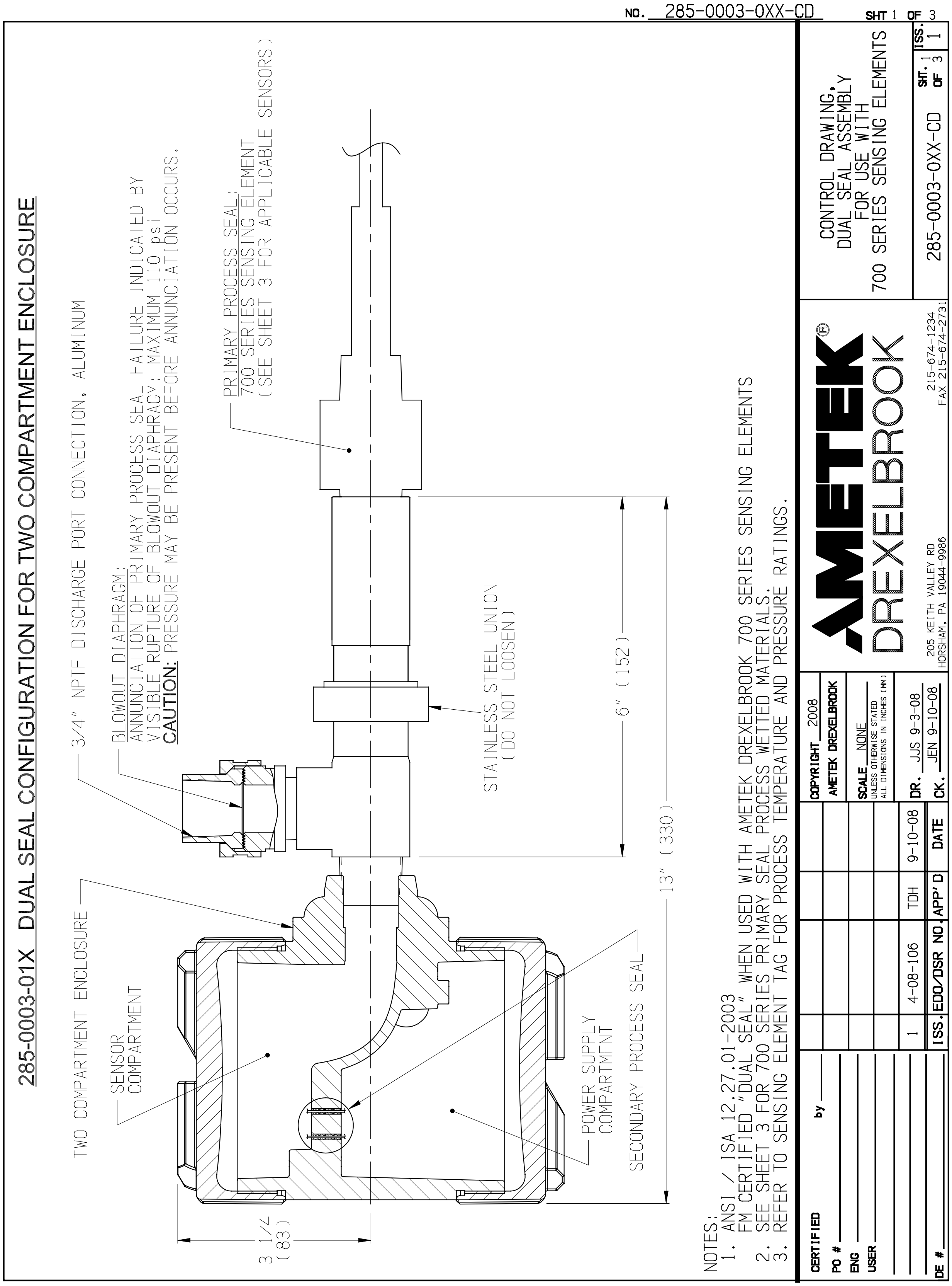
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PAD CAPACITOR KIT FOR POINT LEVEL SWITCHES

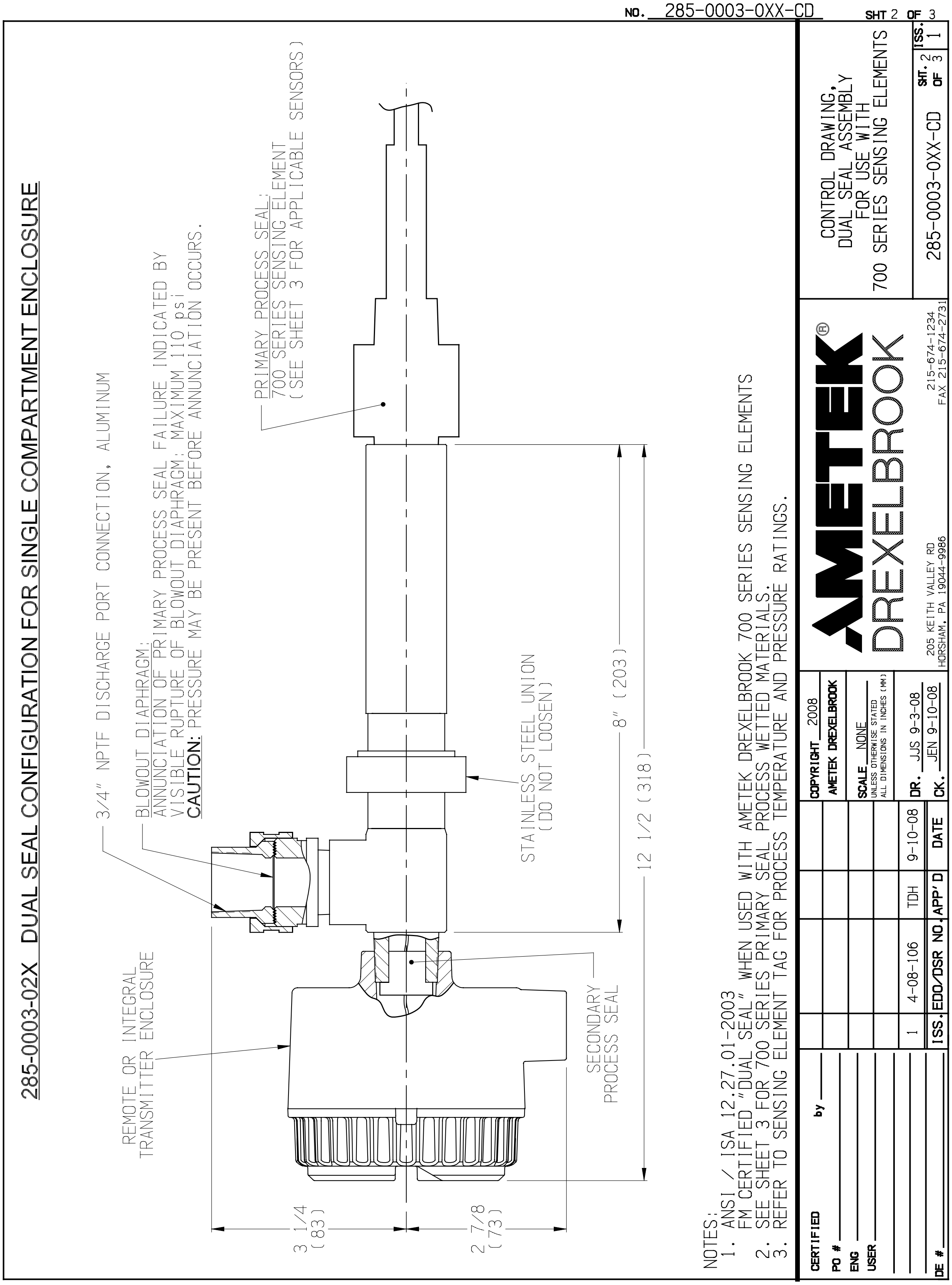
330-0009-022-CD SHT. 3 OF 3 ISS. 2

SHT 3 OF 3

6.6 Dual Seal Assembly for 700 Series Sensing Elements



6.6 Dual Seal Assembly (Continued)



6.6 Dual Seal Assembly (Continued)

NO. 285-0003-0XX-CD SHT 3 OF 3

SENSOR MODEL #	PRIMARY SEAL WETTED MATERIALS
700-0001-022	TFE/316SS
700-0001-024	TFE/316SS
700-0001-026	TFE/316SS
700-0001-034	TFE/CS
700-0001-040	POLYETHYLENE/ 316SS
700-0001-044	PFA/316SS
700-0001-054	TFE/316SS
700-0001-064	TFE/316SS
700-0001-074	TFE/316SS
700-0001-344	PFA/316SS
700-0002-023	TFE/316SS
700-0002-024	TFE/316SS
700-0002-027	FEP/TFE/316SS
700-0002-028	TFE/316SS
700-0002-033	TFE/316SS
700-0002-037	PVDF/TFE/ 316SS
700-0002-040	UHMW PE/ SILICONE/316SS
700-0002-044	PVDF/TFE/ 316SS

SENSOR MODEL #	PRIMARY SEAL WETTED MATERIALS
700-0002-054	FEP/TFE/ 316SS
700-0002-057	PVDF/TFE/ 316SS
700-0002-064	PVDF/TFE/ 316SS
700-0002-224	TFE/316SS
700-0002-321	FEP/TFE/ 316SS
700-0002-360	PFA/TFE/ 316SS
700-0201-005	TFE/316SS
700-0201-025	TFE/316SS
700-0201-026	TFE/316SS
700-0201-027	TFE/316SS
700-0201-028	TFE/316SS
700-0201-035	TFE/316SS
700-0201-051	TFE/316SS
700-0201-052	TFE/316SS
700-0201-058	TFE/316SS
700-0201-059	TFE/316SS
700-0202-002	TFE/316SS
700-0202-053	TFE/316SS

SENSOR MODEL #	PRIMARY SEAL WETTED MATERIALS
700-1202-001	PEEK/316SS
700-1202-010	PEEK/316SS
700-1202-012	PEEK/316SS
700-1202-014	PEEK/316SS
700-1202-018	PEEK/316SS
700-1202-020	PEEK/316SS
700-1202-021	PEEK/316SS
700-1202-028	PEEK/316SS
700-1202-031	PEEK/316SS
700-1202-032	PEEK/316SS
700-1202-033	PEEK/316SS
700-1202-034	PEEK/316SS
700-1202-041	PEEK/316SS
700-1202-042	PEEK/316SS
700-1202-061	PEEK/316SS
700-1202-081	PEEK/316SS
700-9100-303	PEEK/316SS

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DE #

ISS.	EDO/DSR NO.	APP'D	DATE
1	4-08-106	TDH	9-10-08

SCALE NONE

UNLESS OTHERWISE STATED ALL DIMENSIONS IN INCHES (MM)

DR. JJS 9-3-08

CK. JEN 9-10-08

DREXELBROOK
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HORSHAM, PA 19044-9986
215-674-1234
FAX 215-674-2731

CONTROL DRAWING, DUAL SEAL ASSEMBLY FOR USE WITH 700 SERIES SENSING ELEMENTS

285-0003-0XX-CD

SHT. 3 OF 3 ISS. 1

Appendix A: SIL Declaration of Conformity

AMETEK Drexelbrook

AMETEK

SIL Declaration of Conformity

Functional safety of level measuring device according to IEC 61508-2 1999

AMETEK Drexelbrook
205 Keith Valley Rd. Horsham Pennsylvania 19044

declares as manufacturer, that the level measuring device

Intellipoint RXTX Series

Is suitable for the use in a safety instrumented system for **SIL 1**(overfill protection) according to standard IEC61508-2, Sec. 7.4.3.1 1999, if the safety instructions are observed.
The data in this declaration provides the required hardware failure data and does not contain any software assessment required for the full functional safety requirements of IEC 61508

The third party FMEDA with analysis of the safety critical and dangerous faults provides, under the assumption of an annual functional test cycle the following parameters:

exida.com®

SIL (Safety Integrity level)	:	1
HFT (Hardware Fault tolerance)	:	0
SFF (Safe failure fraction)	:	88.7
PFD_{avg} (Fail to Danger)	:	5.0×10^{-4}
λ_{du} (failure rate dangerous undetected faults)	:	116 FIT
λ_{dd} (failure rate dangerous detected faults)	:	605 FIT
λ_{su} (failure rate safe undetected faults)	:	287 FIT
λ_{sd} (failure rate safe detected faults)	:	17 FIT

Steven G. Arnold
AMETEK Drexelbrook
Quality Assurance & Product Safety Manager

July 27, 2004
Date

420-0004-255	Sht. 1 of 1	APP'D BY SGA	
ISSUE	EDO NO.	APP'D	DATE
1	5-04-213	SGA	5/27/04
2	7-04-215	SGA	7/29/04

Appendix A: SIL Declaration of Conformity (Continued)

AMETEK Drexelbrook

AMETEK

SIL Declaration of Conformity

Functional safety of level measuring device according to IEC 61508-2 1999

AMETEK Drexelbrook
205 Keith Valley Rd. Horsham Pennsylvania 19044

declares as manufacturer, that the level measuring device

Intellipoint RXTX Series

Is suitable for the use in a safety instrumented system for **SIL 2** (overfill protection) according to standard IEC61508-2, Sec. 7.4.3.1 1999, if the safety instructions are observed.
The data in this declaration provides the required hardware failure data and does not contain any software assessment required for the full functional safety requirements of IEC 61508

The third party FMEDA with analysis of the safety critical and dangerous faults provides, under the assumption of an annual functional test cycle the following parameters:

exida.com®

SIL (Safety Integrity level)	:	2
HFT (Hardware Fault tolerance)	:	0
SFF (Safe failure fraction)	:	93.2%
PFD_{avg} (Fail to Danger)	:	3.2×10^{-4}
λ_{du} (failure rate dangerous undetected faults)	:	73 FIT
λ_{dd} (failure rate dangerous detected faults)	:	686 FIT
λ_{su} (failure rate safe undetected faults)	:	300 FIT
λ_{sd} (failure rate safe detected faults)	:	0 FIT

Steven G. Arnold
AMETEK Drexelbrook
Quality Assurance & Product Safety Manager

July 27, 2004
Date

420-0004-267	Sht. 1 of 1	APP'D BY SGA	
ISSUE	EDO NO.	APP'D	DATE
1	7-04-215	SG	7/29/04

Appendix B: CE Mark Declaration of Conformity

420-0004-250	Sht. 1 of 1		APP'D BY SGA
ISSUE	EDO NO.	APP'D	DATE
3	Not Released		
4	6-10-118	SA	6-30-10

Declaration of Conformity

AMETEK DREXELBROOK
205 KEITH VALLEY ROAD
HORSHAM, PENNSYLVANIA
USA 19044

declare under our sole responsibility that the product 2-Wire IntelliPoint Point Level Measuring System Model Number RXT2 / SXRXT2 Series, to which this declaration relates is in conformity with the following standards and entitled to carry the CE Mark:

Product Type: **Generic Heavy Industrial**
Following the provisions of 89/336 EEC Directive

Conforms to the emissions requirements of:

EN 55011:1998	Class A, Conducted Emissions 150 kHz to 30 MHz
EN 55011:1998	Class B, Radiated Emissions, 30MHz to 1GHz

Conforms to the immunity requirements of EN 61000-6-2:1999:

EN 61000-4-2:1995	Electrostatic Discharge
EN 61000-4-3:1997	Radiated Immunity
ENV 50204:1994	Radiated Immunity, Pulsed
EN 61000-4-4:1995	EFT/Burst, Power and I/O Leads
EN 61000-4-5:1995	Surge Immunity, Power Leads
EN 61000-4-6:1996	Conducted Immunity, Power and I/O Leads
EN 61000-4-8:1994	Power Frequency Magnetic Fields (10 A(rms)/meter)
EN 61000-4-11:1994	Voltage Dips and Interrupts

Following the provisions of 94/9/EC Directive,

Conforms to the requirements of:

EN 60079-0:2006, EN 60079-11:2007
EN 60079-26:2004, EN 50281-1-1:1998

Product Markings

II 1G Ex ia IIC T5 Ta = -30 -+75°C
II 1D T 90°C

EC-Type Examination Certificate Number NEMKO 03ATEX1612X
NEMKO, PO Box 73, Blindern, N-0314, Oslo, Norway
Notified Body number 0470

Other Standards

Conforms to the requirements of: EN 61010-1:2000

Steven G. Arnold
Quality Assurance & Product Safety Manager
Issue Date 6/29/10

Form 440-0001-001 3/1/2006

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QUOTATIONS: Written quotations are valid for thirty (30) days unless otherwise stated. Verbal quotations expire the same day they are made.

PRICES: All prices and terms are subject to change without notice. Buyer-requested changes to its order ("Orders"), including those affecting the identity, scope and delivery of the goods or services, must be documented in writing and are subject to Seller's prior approval and adjustments in price, schedule and other affected terms and conditions. Orders requiring certified test data in excess of commercial requirements, are subject to a special charge.

ORDER ACCEPTANCE: All Orders are subject to final approval and acceptance by Seller at its office located at 205 Keith Valley Road, Horsham, Pennsylvania 19044.

TERMS OF PAYMENT: Seller's standard terms of payment for Buyers who qualify for credit are net thirty (30) days from date of invoice. All invoices must be paid in United States dollars.

CREDIT: Seller reserves the right at any time to revoke any credit extended to Buyer or otherwise modify terms of payment if Buyer fails to pay for any shipments when due or if in Seller's opinion there is a material adverse change in Buyer's financial condition. Seller may, at its option, cancel any accepted Order if Buyer fails to pay any invoices when due.

DELIVERY: Shipments are F.O.B place of manufacture ("Shipping Point") and the Buyer shall pay all freight, transportation, shipping, duties, fees, handling, insurance, storage, demurrage, or similar charges from Shipping Point. Delivery of goods to common carrier shall constitute delivery and passing of title to the Buyer, and all risk of loss or damage in transit shall be borne by Buyer. Any claims or losses for damage or destruction after such delivery shall be the responsibility of Buyer.

Seller reserves the right to make delivery in installments which shall be separately invoiced and paid for when due, without regard to subsequent deliveries. Delay in delivery of any installment shall not relieve Buyer of its obligation to accept remaining deliveries.

Acknowledged shipping dates are approximate only and based on prompt receipt of all necessary information from Buyer and Buyer's compliance with terms of payment.

TAXES: All sales, excise and similar taxes which Seller may be required to pay or collect with respect to the goods and/or services covered by any Order, shall be for the account of the Buyer except as otherwise provided by law or unless specifically stated otherwise by Seller in writing.

TERMINATION AND HOLD ORDERS: No Order may be terminated by Buyer except upon written request by Buyer and approval by Seller, and if said request is approved by Seller, under the following conditions: (1) Buyer agrees to accept delivery of all of the units completed by Seller through the workday on which Seller receives the written termination request; (2) Buyer agrees to pay to Seller all direct costs and expenses applicable to the portion of the Order that is incomplete.

WARRANTY:
A. Hardware: Seller warrants its goods against defects in materials and workmanship under normal use and service for one (1) year from the date of invoice.
B. Software and Firmware: Unless otherwise specified, Seller warrants for a period of one (1) year from date of invoice that standard software or firmware, when used with Seller specified hardware, shall perform in accordance with Seller's published specifications. Seller makes no representation or warranty, expressed or implied, that the operation of the software or firmware shall be uninterrupted or error-free, or that functions contained therein shall meet or satisfy the Buyer's intended use or requirements.
C. Services: Seller warrants that services, including engineering and custom application, whether provided on a fixed cost or time and material basis, shall be performed in accordance with generally accepted industry practices.
D. Remedies: Seller's liability under this section is restricted to replacing, repairing, or issuing credit (at Seller's option) for any returned goods and only under the following conditions: (1) Seller must be promptly notified, in writing, as soon as possible after the defects have been noted by the Buyer, but not later than (1) year from date of invoice from Seller; (2) The defective goods are to be returned to the place of manufacture, shipping charges prepaid by the Buyer; (3) Seller's inspection shall disclose to its satisfaction that the goods were defective in materials or workmanship at the time of shipment; (4) Any warranty service (consisting of time, travel and expenses related to such services) performed other than at Seller's factory, shall be at Buyer's expense.
E. Repaired/Reconditioned Goods: As to out-of-warranty goods which Seller has repaired or reconditioned, Seller warrants for a period of sixty (60) days from date of its invoice only new components replaced in the most recent repair/reconditioning.
F. Returns and Adjustments: No goods may be returned unless authorized in advance by Seller and then only upon such conditions to which Seller may agree. Buyer must obtain an RMA (Return Material Authorization) number from Seller prior to any return shipment and such RMA number must appear on the shipping label and packing slip. Buyer shall be responsible for the returned goods until such time as Seller receives the same at its plant and for all charges for packing, inspection, shipping, transportation, or insurance associated with returned goods. In the event that credit for returned goods is granted, it shall be at the lesser of the then current prices or the original purchase price. Claims for shortage or incorrect material must be made within five (5) days after receipt of shipment.

ALL OTHER WARRANTIES, FOR ANY OF SELLER'S GOODS OR SERVICES, WHETHER ORAL, WRITTEN, EXPRESS, IMPLIED, STATUTORY OR OTHERWISE, INCLUDING WITHOUT LIMITATION ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR PURPOSE ARE EXCLUDED.

INTELLECTUAL PROPERTY: Seller's sale of goods or provision of related documentation or other materials to Buyer shall not transfer any intellectual property rights to Buyer unless Seller specifically agrees to do so in writing. Seller shall retain ownership of all applicable patents, trademarks, copyrights and other intellectual property rights. Buyer shall not use, copy or transfer any such items in violation of Seller's intellectual property rights or applicable law, or for any purposes other than that for which the items were furnished.

Seller shall defend any lawsuit brought against the Buyer based on a claim that the design or construction of the goods sold hereunder by Seller infringe any United States or Canadian Patent, Copyright or Mask Work Registration, provided that Buyer promptly notifies Seller of such claim in writing and further provided that, at Seller's expense, (1) Buyer gives Seller the sole right to defend or control the defense of the suit or proceeding, including settlement, and (2) Buyer provides all necessary information and assistance for that defense. In the event of a charge of infringement, Seller's obligation under the agreement shall be fulfilled if Seller, at its option and expense, either (i) settles such claim; (ii) procures for Buyer the right to continue using such goods; (iii) replaces or modifies goods to avoid infringement; or (iv) accepts the return of any infringing goods and refunds their purchase price; or (iv) defends against such claim.

If Buyer furnishes specifications or designs to Seller, the obligations of Seller set forth above shall not apply to goods made by Seller using such specifications or designs, and Buyer shall defend, indemnify and hold Seller harmless against any third party claims for infringement which arise out of Seller's use of specifications or designs furnished by Buyer.

SOFTWARE LICENSE: If goods purchased hereunder include software ("Software"), Buyer may use the Software only as part of the goods. Buyer may not use, copy, or transfer any of the Software except as may be permitted under the applicable License Agreement provided with the goods. Buyer's right to use, copy or transfer the Software shall terminate upon termination of Buyer's right to use the goods.

PACKAGING/WEIGHTS AND DIMENSIONS: Buyer specified packing or marking may be subject to additional charges not otherwise included in the price of the goods. Published weights and dimensions are estimates or approximate only and are not warranted.

FORCE MAJEURE: Seller shall not be responsible for delays in delivery or any failure to deliver due to causes beyond Seller's control, including but not limited to the following items: acts of God, war, terrorism, mobilization, civil commotion, riots, embargoes, domestic or foreign governmental regulations or orders, governmental priorities, port congestion, acts of the Buyer, its agents or employees, fires, floods, strikes, lockouts and other labor difficulties, shortages of or inability to obtain shipping space or transportation, inability to secure fuel, supplies or power at current prices or on account of shortages thereof, or due to limitations imposed by the extent of availability of Seller's normal manufacturing facilities.

If a delay excused per the above extends for more than ninety (90) days and the parties have not agreed upon a revised basis for continuing providing the goods or services at the end of the delay, including adjustment of the price, then Buyer, upon thirty (30) days' prior written notice to Seller may terminate the Order with respect to the unexecuted portion of the goods or services, whereupon Buyer shall promptly pay Seller its reasonable termination charges upon submission of Seller's invoices thereof.

LIMITATION OF LIABILITY: Seller's liability for any claim of any kind, except infringement of intellectual property rights, shall not exceed the purchase price of any goods or services which give rise to the claim. ***SELLER SHALL IN NO EVENT BE LIABLE FOR BUYER'S MANUFACTURING COSTS, LOST PROFITS, LOSS OF USE OF THE GOODS OR SERVICES, COST OF CAPITAL, COST OF SUBSTITUTE GOODS, FACILITIES, SERVICES OR REPLACEMENT POWER, DOWNTIME COSTS, CLAIMS OF BUYER'S CUSTOMERS FOR DAMAGES, OR OTHER SPECIAL, PROXIMATE, INCIDENTAL, INDIRECT, EXEMPLARY OR CONSEQUENTIAL DAMAGES.*** Any action against Seller must be brought within eighteen (18) months after the cause of action accrues. These disclaimers and limitations of liability shall apply regardless of the form of action, whether in contract, tort or otherwise, and further shall extend to the benefit of Seller's vendors, appointed distributors and other authorized resellers as third-party beneficiaries.

PROHIBITION FOR HAZARDOUS USE: Goods sold hereunder generally are not intended for application in and shall not be used by Buyer in the construction or operation of a nuclear installation or in connection with the use or handling of nuclear material, or for any hazardous activity or critical application, where failure of a single component could cause substantial harm to persons or property, unless the goods have been specifically approved for such a use or application. Seller disclaims all liability for any loss or damage resulting from such unauthorized use and Buyer shall defend, indemnify and hold harmless the Seller against any such liability, whether as a result of breach of contract, warranty, tort (regardless of the degree of fault or negligence), strict liability or otherwise.

EXPORT CONTROL: Buyer shall comply with all export control laws and regulations of the United States, and all sales hereunder are subject to those laws and regulations. Seller shall not be named as shipper or exporter of record for any goods sold hereunder unless specifically agreed to in writing by Seller. At Seller's request, Buyer shall furnish Seller with end-use and end-user information to determine export license applicability. Buyer warrants, in accordance with U.S. Export Law, that goods sold hereunder shall not be destined for facilities or activities involving nuclear, chemical or biological weapons, or related missile delivery systems in named prohibited regions or countries.

GOVERNING LAW: Seller intends to comply with all laws applicable to its performance under any order. All matters relating to interpretation and effect of these terms and any authorized changes, modifications or amendments thereto shall be governed by the laws of the Commonwealth of Pennsylvania. No government contract regulations or clauses shall apply to the goods or services, this agreement, or act to bind Seller unless specifically agreed to by Seller in writing.

NON-WAIVER BY SELLER: Waiver by Seller of a breach of any of these terms and conditions shall not be construed as a waiver of any other breach.

SEVERABILITY AND ENTIRE AGREEMENT: If any provision of these terms and conditions is unenforceable, the remaining terms shall nonetheless continue in full force and effect. This writing, together with any other terms and conditions Seller specifically agrees to in writing, constitutes the entire terms and conditions of sale between Buyer and Seller and supercedes any and all prior discussions, and negotiations on its subject matter.

DREXELBROOK

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